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NOVEMBER 1953—25 CENTS

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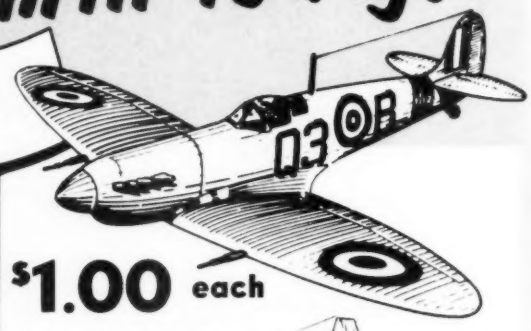

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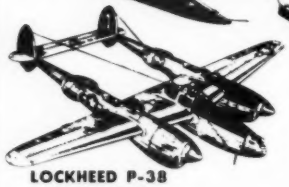
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Convair B-36 Bomber
Republic F-84 Thunderjet
Lockheed C-69 Constellation
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Russian MIG-15
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Transport
Northrop F-89 Scorpion
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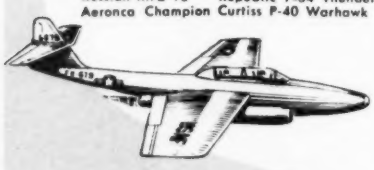
Boeing B-47 Stratojet
Convair B-36 Bomber
McDonnell F2H-1 Banshee

25¢ and 50¢ kits have plastic canopy and prop disc.



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25th Year of Publication

NOVEMBER 1953 Vol. XLIX—No. 5

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JAY P. CLEVELAND, President and Publisher
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Contributing Editors: Peter Chinn (England), Don Grout, Ed Lorenz, Ted Martin, Bruce Wennerstrom, Harry Williamson

Executive and Editorial Office: 551 Fifth Avenue, New York 17, N. Y.

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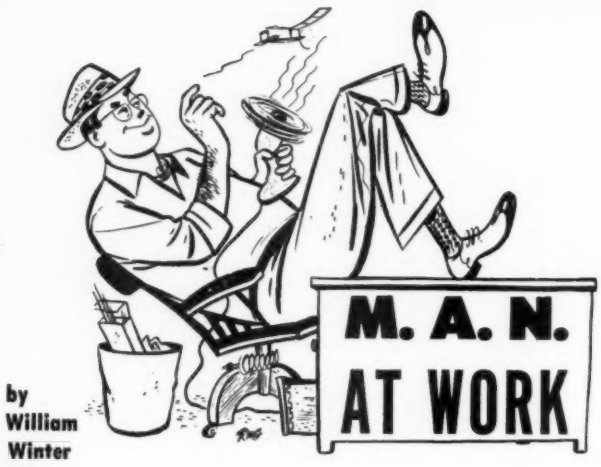
Editorial and Business offices: 551 Fifth Ave., New York 17, N. Y. Published monthly by Air Age, Inc., 1140 East West Highway, Silver Spring, Maryland. Jay P. Cleveland, President and Treasurer; T. P. Johnson, Vice Pres.; G. E. Johnson, Sec. Entered as second class matter Feb. 1951 at the post office at Silver Spring, Md., under the act of March 3, 1879. Additional entry at New York, N. Y. Price 25c per copy. In U. S. Subscription Rates — Within U. S. only: 1 yr. $2.50; 2 yrs. $4.75. In Canada: 1 yr. $3; 2 yrs. $5.75. All other parts of the world: 1 yr. $3.50; 2 yrs. $6.75. Change of Address — Send to MODEL AIRPLANE NEWS, Subscription Department, 551 Fifth Avenue, New York 17, New York, at least one month before the date of the issue with which it is to take effect. Send old address with the new, enclosing if possible your address label or copy. The Post Office will not forward copies unless you provide extra postage. Duplicate issues cannot be sent.

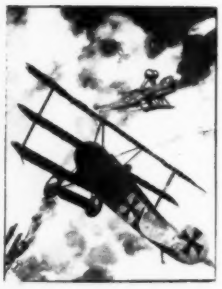


by William Winter

▶ Allowing for the four lost war years, the Annual Model Airplane Championships have been held for 27 years. If the twenty-second Nats, held July 27 through August 2 at the Naval Air Station, Willow Grove (where once the Pitcairn autogyros were born) is a criterion, the 1980 Nats, 27 years hence, will begin on July 4 with Pete Andrews doing 30 minutes indoor stick, and end on Labor Day with Walt Good fighting it out for first place in RC (they got him this time!). Jim Walker will fly three Fireballs at once, Taibi will win a free flight first, Carl Goldberg will fly a Cumulus and chalk up his fifty-fourth consecutive Nats, and George "Poppa" Aldrich eventually will get out of the Senior group in stunt so someone else can win. It's the million little things like this that make the Nats. But space is limited and MAN at Work had better remember his age and stick to the important ones. As one new junior remarked, "Gee, but you don't look as old as we thought you were—does the magazine buy articles?"

* * *

▶ This was the biggest Nats since the war. Some 1,200 entrants compared with less than 1,000 in recent years. Though Matty Sullivan, who ably directed it, proudly boasted that it was the largest ever, the pre-war Chicago fracas may have been bigger. Should have been, for all Chicago turned out. But the twenty-second was good going, nonetheless. It certainly was one of the longest in history. Several days too long, in fact. So many events you can't get to study them all. Even Bill White, Jr., both Junior and National Champ, who, with the aid of Superman's cloak, competed in nine events, didn't get into some corners of the field. Officially, over 30 events were listed. Even though we don't have all three classes in every event, it may (*Continued on page 5*)



PLANE ON THE COVER

In September of 1917 von Richthofen, the great German Ace, returned to the front with the Fokker Dr. 1 Triplane, the German answer to the Allied Camels, Spads, and SE-5's. The Tripe probably was the most maneuverable plane ever built. It was a tiny ship, having a top wingspan of 20 ft. 6 in., and an over-all length of 19 ft. Engines varied but Richthofen's was said to be the 110 hp Oberursel. Top speed was about 115 mph but the Dr. 1 could climb to 3,300 ft. in less than two minutes, comparable to the best in private plane performance today.

NEXT MONTH'S COVER

An ultra modern jet, the Canadian Avro CF-100, is the subject of artist Jo Kotula's brush in the December issue. This big, two engine jet is an all-weather job that would figure in hemisphere defense. Power plants are the big Canadian built Orendas turbojets. An interesting detail is the use of dual wheels throughout.

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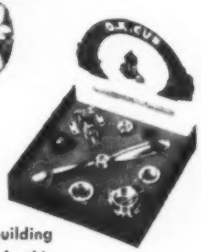

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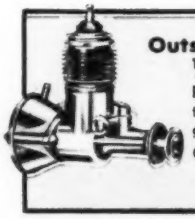

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Ohlsson & Rice

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Senior Class Control Line Combat	Cheminol's O & R XL 4
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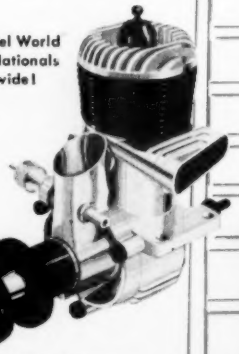

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MAN at Work

(*Continued from page 2*)

be said that approximately 90 people take first places. Run this down to five places and you have 450 winners. Very many of these winners win multiple places but unless you take about six places you don't make history. Win two firsts and someone may remember your name.

• • •

▸ Coping with so many entrants creates all manner of emergencies, such as the Navy chopping holes in their wire fences to let the free flighters through like so many Indian runners vanishing into the forest, or the consternation at the Route 611 diner when it ran out of eggs. Though one could eat on the station, modelers are a lot of Gipsies. Someone confused Joe White with brother Bill and tried to award the National Championship to Joe. Joe had so many points himself he figured it could be. Both boys belonged to the Northern California Free Flight Council, so it's understandable. The Council had bushel baskets of points and won the Club Championship. Woody Blanchard was Open Champ and Stu Savage and Ronald Plotzke tied for Senior.

• • •

▸ Many Easterners who came saw, but did not conquer, because they didn't enter. Seemed disappointed. Like the bather wetting his big toe before taking the plunge. Let's hope the meet gets back this way before another 20 years! Actually, there was plenty of hot flying. Indoor boys, for example, made the most of a rare opportunity to fly under a high ceiling in the airship dock at Lakehurst, N. J. Bill Dunwoody (see "For the RC Fan" this issue), tossed a glider for 109.6, more than two seconds better than Carl "the arm" Rambo could manage. And any time an indoor job breaks a half hour, as did Andrew's stick, you have seen the best. Does remind us, however, of Carl Goldberg's coverage of the 1934 Nats when he said that the boys, having broken 20 minutes, were figuring they'd hit 40 minutes before long. A 25:26.6 time in indoor cabin had the fliers taking their hats off to James Grant, Manchester, Conn. Truly a magnificent feat. But where does this guy practice? He topped Bilgri by four minutes! And Joe knows how to handle a rubber motor, indoors or out.

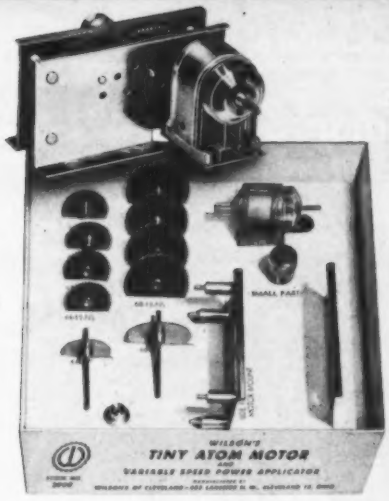
• • •

▸ Speed produced some good times, notably in CD Senior, where Sam Dehelean manages 153.85 mph. Open, same event, was 151.70, by Guy Roger. There's another brother act, too. Al Davis, a Junior, with 142.86 in the same event is brother of Herbert L. Davis, Senior, with a first in B Senior at 125. In past two years most exciting progress has been in A, which ships frequently trim the B jobs. Tom Baker broke 130 by a fraction in Open and a Junior, Walter Pyron, turned 123.29. Most of the great names in speed are gone. Some of the old fire-eaters were about, such as deBolt, Storey and Mahieu. Only Mahieu flew, however, doing about 140 with a hybrid "60" concocted to give the boys something to wonder about. Lew had his eye on PAA-Load, where he got a first by diligent watching of the weather and a last minute winning hop. Lew is Kiwi conscious, natch. He had to beat out Jack Oxley, another Californian for that first, and Jack is reputed to be as hot as a pistol these days. Storey was tempted to drag out his old big ships—he says they should be bigger to fly right. Mahieu and deBolt volunteered independently that too much power is required to drag lines around. When "D" said 90 per

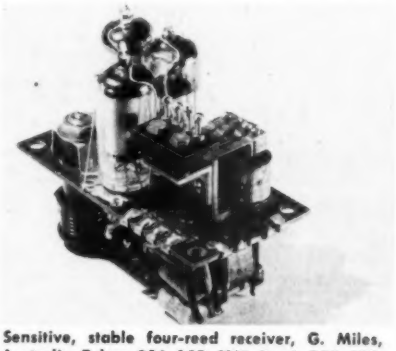
(*Continued on page 8*)

Radio Control News

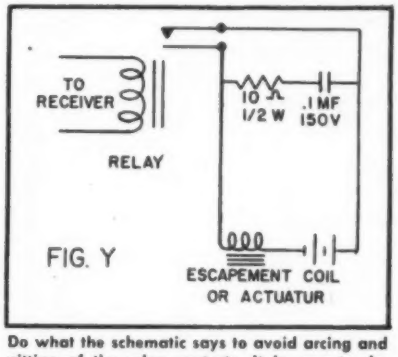
by ED LORENZ



Motor and speed reducer unit, by Wilson. Ten speeds from 30-400 rpm available by selection of the proper gears.



Sensitive, stable four-reed receiver, G. Miles, Australia. Tubes: 3S4, 1S5, 3V4. Reeds 250-400.



Do what the schematic says to avoid arcing and pitting of the relay contacts. It is easy to do.

If you ever chased an RC, you'll be interested in these reliability tips. Some tricky new products reviewed.

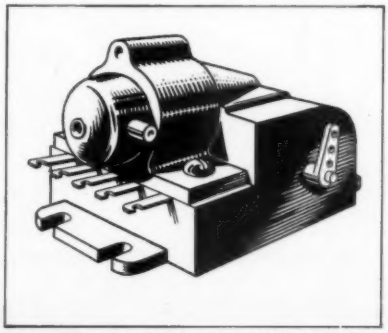
▸ Last month we began a discussion concerning the various possible causes of malfunctioning of the radio equipment and its allied components in a typical hook-up. Before going into the receiver and relay problems this month, there are a few additions to be made to last month's discussion. These are items that were picked up at the recent Nationals and are either added this month or repeated to stress their importance.

Wiring should always be done with stranded wire and rosin core solder. Several radio failures at the Nats were attributed to fractured solid wire and bad solder joints.

Escapement linkage should be as free of bind as possible without allowing too much "slop" in the control itself. The use of the "torque tube" method of making the connection from escapement to control surface provides the least amount of friction. Bonner and Curry favor the use of the yoke on the control surface and the pin on the torque rod, just the reverse of what is common at present.

Perhaps the biggest source of mystery to the model

(*Continued on page 40*)



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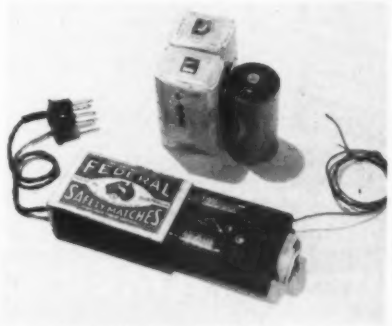

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Buried In This Ad are most of the new items. Sometimes there isn't time or space to list all of them. But, if available anywhere, we have it.

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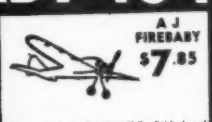

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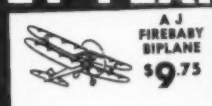

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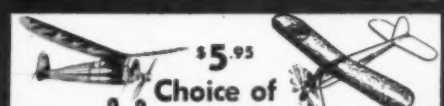

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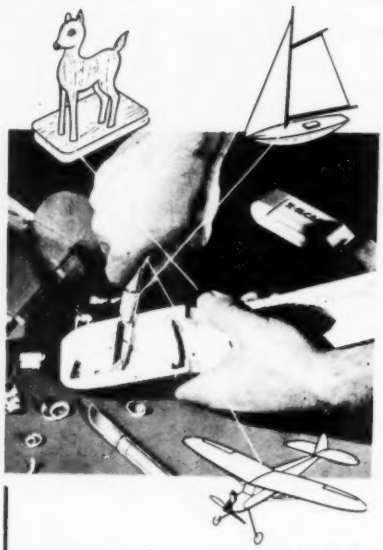

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Man At Work

(*Continued from page* 5)

cent of the drag, we wondered; but along came Lew with 85 per cent.

* * *

▸ Stunt shows continued emphasis on realism and finish. Open was won by Bob Elliott with 372.5 points, which is no surprise, and Senior again went to George Aldrich with a Nobler. Walton Pyron, whose name kept popping up all over the place, had 337.5 in Junior. Enterprise's Jerry Brofman snapped up the Nobler on the spot (MAN plan department still has this item). Jerry, incidentally, was back with one of his free flights and had he won—yet again—he would have been searched for a rabbit's foot. And in stunt, most of the "names" were missing. No Palmer, etc. If Andrews flew we missed it, but he was demonstrating the Trixter Beam all week. Combat was the usual manufacturer's delight but there's a chap in Junior, Dick Hurst, Fort Worth, who racked up 460 points to nearest competitor's 80. They are wild men down thataway. Combat did prove that stunt jobs have 100 per cent more area than required for flight—or loops! These jobs come in on a prayer, but no wing.

* * *

▸ Carrier event technique continues to improve. For instance, it used to be a big deal when a guy finished a flight without a crack-up. Oh, they still have crack-ups but some of the ships really perform. Saw a couple of Savages—models, not builders—equipped with two Foxes. One engine ran out of gas. This is it, we thought. But no, the guy puts the other engine on low motor and continues to make passes at that deck. Remarkable!

The job that stopped the meet was a scale ukie by Tom Dean. Pictures appear elsewhere this issue but all the pix together aren't worth a thousand words in this case. Here's a guy that even makes the scale brake linings work, and from the pedals. Who hooks his leads to the scale control system? Who makes the fuselage out of dowels to imitate steel tubing? The same number of coats of paint, and the same kind of paint were used for absolute fidelity to scale. The seat, stitching, instruments (cut from photographic copies of the real panel); absolutely everything, excepting the Top Flite prop, was true scale. Victor Fritz, scale judge since the beginning of time, declared it the finest job ever to grace the Nationals. Like Tom's Great Lakes last year (that one had workable turn buckles on the wires!), this Aeronca Duster flies.

* * *

▸ One amazing thing about the free flight events—rubber, gas or glider—was the lack of limit flights. After Dick Duvendich's 22:08.2 in A Open, a few totals ran to about 17 minutes, a few more to 13 and 14, but that was about it. George Perryman, who we later saw off to Yugoslavia as American representative at the Nordic finals, said it took two hours to move five places in processing, which gives point to the problems we'll have with the adoption of the needlessly complicated FAI rules. Some of the plan forms and cross sections would throw Einstein for a loss. And well meaning but untrained personnel at all big meets are not Einsteins.

Free flight gas hasn't changed by as much as a wing rib in several years. Did see a couple of intelligent attempts to be different. One group was flying pylons which used celluloid for the wing mount. Platform built into the top and just one structural member at the rear edge seam. In the air, these ships looked as if the wing were held on by one thin strip of wood at the trailing edge, creating considerable mystery among the uninitiated. Quite a few ships with high thrust lines, notably one unidentified job with the nacelle on the center section with the wing on a pylon. Watched this one carefully. Climbed almost vertically, rock steady, as the old Zippers used to do, but much steeper. Timer stuck, though, and it went out of sight right over head.

And there was science in the Cargo Clipper event. Hal Roth, who lifted 23-plus oz. for a new record, did it with a good looking ship of more than 600 sq. in. area and a Mac .049 Diesel. There is a tiny bundle of power! Roth can carry 30 oz., it is believed. Roth, Ernie Shailor, a free flight winner last year. Larry Conover and C. O. Wright fought this one out. First one, then another, would top the list. Who had carried what finally got hard to find out. Spent half of a day chatting with that grand old man—comparatively speaking—of the game, C. O. Wright, whose interest would infect a chess player. Parked nearby was Carl Goldberg—Cumulus with a thin wing, almost flat it seemed. Man, oh man! Sal Taibi nearby with a big Spacer. Sal finally got his first in ROW Open. The Spacer, incidentally, is one heck of a fine ship. Too many guys in the East are having trouble getting this one at the hobby shops. Take it up with Sal!

Radio saw competition as close—with a real hair-raising finish, as we used to see in the last half hour of D speed when the old time West Coast hot shots would fight for that first. On the final Sunday the lead seesawed between Dick Allen, Howard Bonner, Walt Good, and Jack Port, who finally took it with a spot landing seven minutes before the meet closed. Small, high powered rudder only ships won out, despite the ability of multi-control boys to fly inverted, do dives, and consecutive loops. Spot landings did it. Give the rudder boys a break, MAN at Work always thought, but it looks as if the cards are stacked just a little high against the multi-channel stuff. More than 75 entrants flew out of about 150 entered in this event. Evening sport fly sessions produced all kinds of sights, like Carter's .03 Diesel scale Tiger Moth, Sterling's 5-ft. Piper Tripacer, which flies well; dog fights with ribbons, inverted demonstrations, with outside loops and vertical S's in the approach by deBolt with a symmetrical wing five channel ship. Very few flyaways—one did get off and landed near Wilmington, Del. Ninety per cent were on 27.255.

One thing we don't get is the poor showing in free flight Half-A scale. With individual builders nation-wide, this is a popular subject, yet most contest entrants prefer to watch the other guy do it. Ed Stoll really did it with 290.22 points in Open, about 150 points better than the second place man. Had only three winners total listed in Senior and Junior. A junior, Bobby Kopski, with 13.53, stood out in Half-A free flight, Jack Oxley having 13.05 in Open, and Gable Ray, who was into almost everything, a 14.14. There was a 22:08.2 in C Open, Dick Duvendich, a 14:11.4 in Senior, David Aspen, and a 17.13 in Senior, Alvin Grenoble. Real heartbreaker was Dan Sobalo's 17:19 in B Open—Marvin Burley, Jr., beat him by .4 second. How close can you get?

* * *

▸ A Nationals is a blend of many impressions. The work hangar, for example. It is lighted all hours of the night. Thousands of airplanes are about, every type, size, and degree of workmanship. Freaks, super scales, and hopefuls that never have a chance. Some guys repair late, some build airplanes overnight (all year they have, so why?), and a few never leave the place day or night for the week. Their families bring them food,

(*Continued on page* 54)

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28 First place winners at the '53 nationals used TOP FLITES and POWERPROPS

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Will Stewart, Trenton, N. J., created a sensation at the Nationals when his tiny original racer streaked to victory in the Class ½ A Speed, Open event, at a speed of 84.66 m.p.h. The hot little number has an 8" span, 2 oz. weight. Will used a Thermal Hopper engine with original fuel and a 4⅜/6½ **POWER PROP.** The balding fellow on the left is Carl Goldberg of TOP FLITE MODELS INC.

Class B Free Flight, Jr.
Harry Capper
Philadelphia, Pa.
11 min. 52 sec.
Engine: Torp 29
PROP: 10/6 POWER PROP
Plane: Sandy Hogan
Fuel: Power mist

Class B Free Flight, Open
Marvin Burley, Jr.
Spartanburg, S. C.
17 min. 19.4 sec.
Engine: K & B 29
PROP: 11/4 TOP FLITE
Plane: Modified Senator
Fuel: O & R #2

C. Hill Hutchins, Jr., Spartanburg, S. C., has good reason to flash that smile. His sleek Bendix Trophy Mustang, powered by a Fox 35, Power mist fuel, captured top honors in the Control Line Flying Scale Senior event. **Four blade 10/6 POWER PROP.**

Control Line Flying Scale, Jr.
Barry Burr
Corpus Christi, Texas
Engine: Torp 29
PROP: 10/6 TOP FLITE
Plane: P-47D
Fuel: Thimble Drome Racing

Control Line Fly. Scale, Open
Thomas Dean
Corpus Christi, Texas
Engine: Cameron 19
PROP: 9/6 TOP FLITE
Plane: Aeronca Champion Duster
Fuel: O & R XL-4

R.O.W. Free Flight, Jr.
John M. Clapp
Greenfield, Mass.
7 min. 2.6 sec.
Engine: Torp .049, Thermal Hopper head
PROP: 6/3 TOP FLITE
Plane: Original
Fuel: K & B 1000

Uncle Sam can be justly proud of **Jim Kelly.** This inland sailor from Mission, Kansas won the R.O.W. Free Flight Senior event with his Zeek. Jim used a 9/4 **TOP FLITE,** harnessed to an Elfin .15 engine, his winning time–10:07.2, fuel–McCoy Diesel.

P.A.A. Clipper Cargo
Hal Roth
Richmond, Calif.
23¼ oz., 42 sec.
Engine: McCoy Diesel
PROP: 7/4 TOP FLITE
Plane: Blue Boy (Original)
Fuel: McCoy Diesel

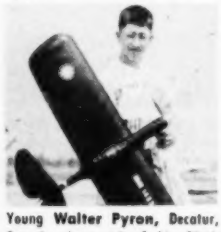
Team Racing
Bobby Huffer
Annapolis, Md.
Engine: Fox Racing 29
PROP: 9/8 POWER PROP
Plane: Little Bess (Original)
Fuel: Power mist

Class C Speed, Sr.
Sam Deneleon
Detroit, Michigan
153.85 m.p.h.
Engine: McCoy 60
PROP: 9/11 POWER PROP
Plane: Original
Fuel: Original

½ A Scale Free Flight, Open
Ed Stoll
Detroit, Michigan
Engine: Wasp .049
PROP: 6/3 POWER PROP
Plane: Fairchild 24
Fuel: Thimble Drome Racing

Here's **Sal Taibi** spinning the **9/4 TOP FLITE** on the original Payload he used to win the R.O.W. Free Flight Open event. Mrs. Taibi (standing in background), traveled with Sal from Lakewood, California, to lend her moral support. Engine is a Torp 23, flight time was 13:00.5, fuel –O & R XL-2.

Class A Free Flight, Sr.
Carl Curtis
Yuba City, Calif.
12 min.
Engine: Fox 19
PROP: 10/3½ TOP FLITE
Plane: Spacer A B
Fuel: Ohlsson Gold Seal 1/2A



Young **Walter Pyron,** Decatur, Georgia, is proud of his Black Tiger. Powered by a Fox 35 with a **10/6 TOP FLITE,** the Tiger racked up 354 points to win the Junior Stunt event, fuel–Testors 39.

Class A Free Flight, Open
Dick Duvendeck
Portsmouth, Ohio
22 min., 8.2 sec.
Engine: E.D. 15 (Diesel)
PROP: 9/6 TOP FLITE
Plane: Zeek
Fuel: Simpson Special

Combat, Junior
Richard J. Heist
Ft. Worth, Texas
460 points
Engine: Fox 29
PROP: 9/6 TOP FLITE
Plane: Patches (Original)
Fuel: K & B 100

Combat, Senior
Gerald Wagner
West Cheshire, Conn.
560 points
Engine: Fox 35
PROP: 10/6 POWER PROP
Plane: Rock (Original)
Fuel: O & R XL-4

Judson Stone's dad, who passed away recently, would have been especially proud of his son for winning first place honors in the Class A Free Flight, Jr. event. The Topeka, Kansas lad used a Zeek, with a 9/4 **TOP FLITE** on an Arden 19 engine. Judson's winning time was 14:06.2, fuel–O & R #2.

Combat, Open
William Andrews
Easton, Pa.
520 points
Engine: Fox 35
PROP: 9/6 POWER PROP
Plane: Ringmaster
Fuel: Testors 39

Class C Free Flight, Jr.
Bill Gregory
Springfield, Ohio
4 min. 38.8 sec.
Engine: Atwood 62
PROP: 13/5½ TOP FLITE
Plane: Sailplane
Fuel: K & B 1000

Class C Free Flight, Sr.
David Espen
Bronx, N. Y.
14 min. 11.4 sec.
Engine: Fox 35
PROP: 11/6 TOP FLITE
Plane: Sandy Hogan
Fuel: Thimble Drome Racing

Class C Free Flight, Open
Al Grenoble
Yuba City, Calif.
17 min. 13 sec.
Engine: Fox 59
PROP: 12/5 TOP FLITE
Plane: Modified Sailplane
Fuel: Ohlsson Gold Seal 200

½ A Navy Carrier, Sr.
William Davies
Maplewood, N. J.
Engine: Wasp .049
PROP: 6/3 POWER PROP
Plane: F6F Hellcat
Fuel: Homebrew

Navy Carrier, Jr.
William M. White, Jr.
Sacramento, Calif.
Engine: Atwood .49
PROP: 11/8 POWER PROP
Plane: Stearman N3N
Fuel: K & B 1000

Navy Carrier, Sr.
Dave Domizi
Rocky River, Ohio
Engine: Fox 35
PROP: 9/6 TOP FLITE
Plane: AF2S—Guardian
Fuel: Power mist

Gail Eckstein flew a Bonanza all the way from San Lorenzo, Calif., and then flew away with top honors in the ½ A Navy Carrier, Open event. Gail stuck a **5 ¼ /5 POWER PROP** on a Thermal Hopper engine, enabling his SBD-3 Dauntless to pile up a winning total of 253 points. What's the "coming attraction" Gail?

Fifteen-year old **Johnny Sparnicht,** Hempstead, N. Y., got the thrill of his life when his Nieuport 11 took 1st place in the Jr. ½ A Scale Free Flight event. Johnny's power plant was a Cub .04?, his prop a **6/3 TOP FLITE,** and Thimble Drome Racing Fuel. Nice goin' John!

LOOK FOR THIS PROP CABINET AT YOUR LOCAL DEALER
It contains FREE prop charts showing what size prop to use in the average engine-and-

TOP FLITE MODELS INC.
2635 S. Wabash Ave., Chicago 16, Ill.

Remember.
It's the Props... That Pull the Planes... That Make the Flights... That Win the Prizes!

Dave Kneeland, left, and helper Joe Foster urge Dave's winning model off to second round maximum. This ship uses a Cumulus wing and stabilizer.

America Wins Wakefield & FAI

by BILL DEAN

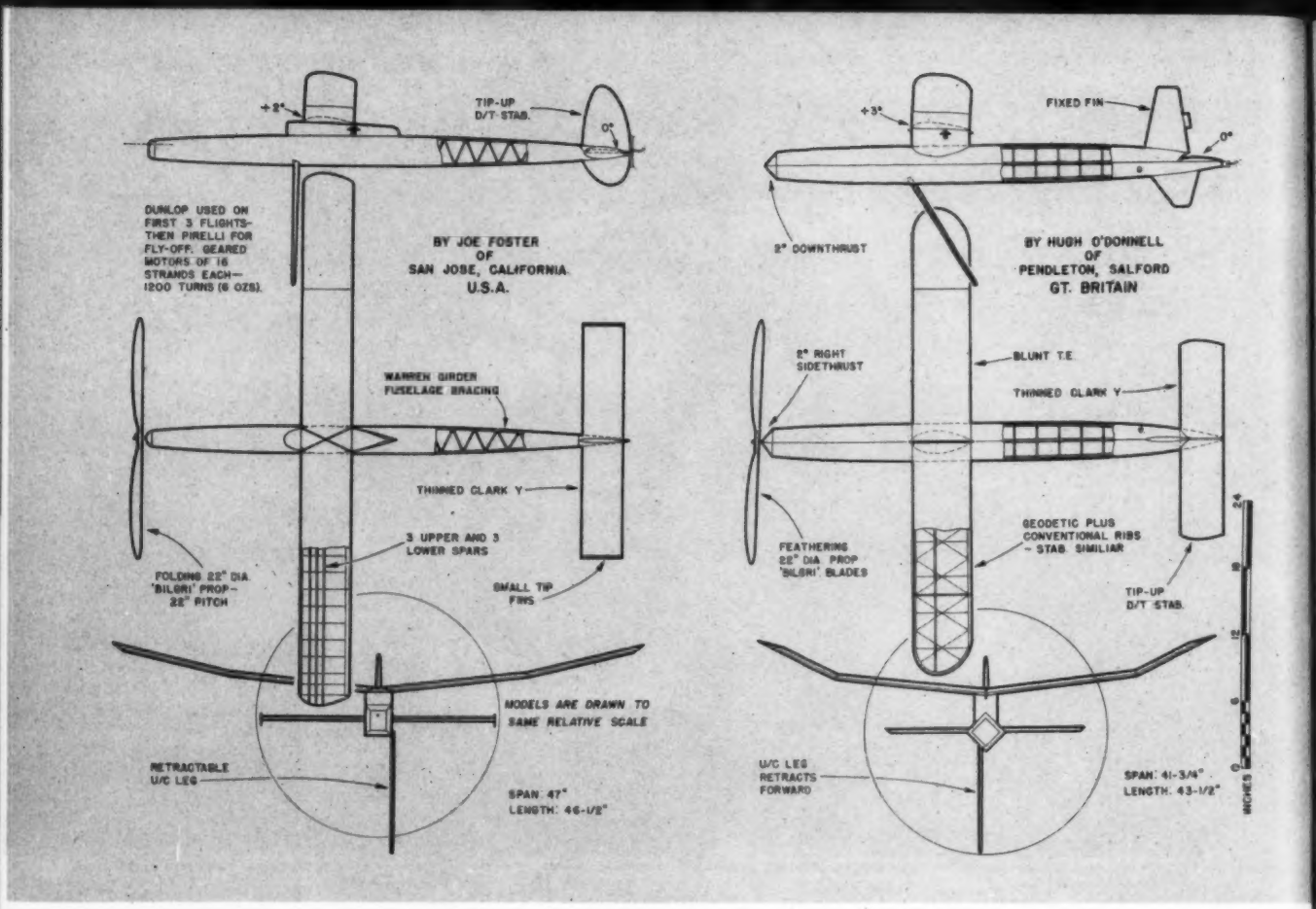
In the most stiffly contested international meet of all time, the U. S. was fortunate to make a clean sweep of both great events and the team trophies for each. Wakefield was a photo finish.

▶ Top-line flying, the kind of weather that model builders dream about, plus superb contest organization all combined to make the '53 World Championships—held at Cranfield, England—one of the most memorable international contests of all time.

To relieve the suspense, we'll say here and now that the Free Flight Power Trophy and the famed old Wakefield Cup will be gracing American parlors for the next 12 months, the new World Champions in F/F and rubber being, re-

Joe Foster making a few minor repairs to his model before the fly-off on fourth round, which he won with 7:25 flight. This ship used gears.

Fourteen-year-old Hugh O'Donnell scored maximums to tie for Britain with U. S., Argentina at top. Feathering prop and retracting gear.


+2°
TIP-UP D/T STAB.
0°
DUNLOP USED ON FIRST 3 FLIGHTS— THEN PIRELLI FOR FLY-OFF. GEARED MOTORS OF 16 STRANDS EACH— 1200 TURNS (6 OZS).
BY JOE FOSTER OF SAN JOSE, CALIFORNIA U.S.A.
WARREN GIRDER FUSELAGE BRACING
THINNED CLARK Y
3 UPPER AND 3 LOWER SPARS
FOLDING 22" DIA. 'BILGRI' PROP— 22" PITCH
SMALL TIP FINS
MODELS ARE DRAWN TO SAME RELATIVE SCALE
RETRACTABLE U/C LEG
SPAN: 47" LENGTH: 46-1/2"
+3°
FIXED FIN
0°
2° DOWNTHRUST
BY HUGH O'DONNELL OF PENDLETON, SALFORD GT. BRITAIN
2° RIGHT SIDETHRUST
BLUNT T.E.
THINNED CLARK Y
FEATHERING 22" DIA PROP 'BILGRI' BLADES
GEODETIC PLUS CONVENTIONAL RIBS — STAB. SIMILIAR
TIP-UP D/T STAB.
U/C LEG RETRACTS FORWARD
SPAN: 41-3/4" LENGTH: 43-1/2"
INCHES

Winning smile from Foster after fourth flight eased out O'Donnell and Scotto. Technically, three countries share first, but U. S. holds trophy.

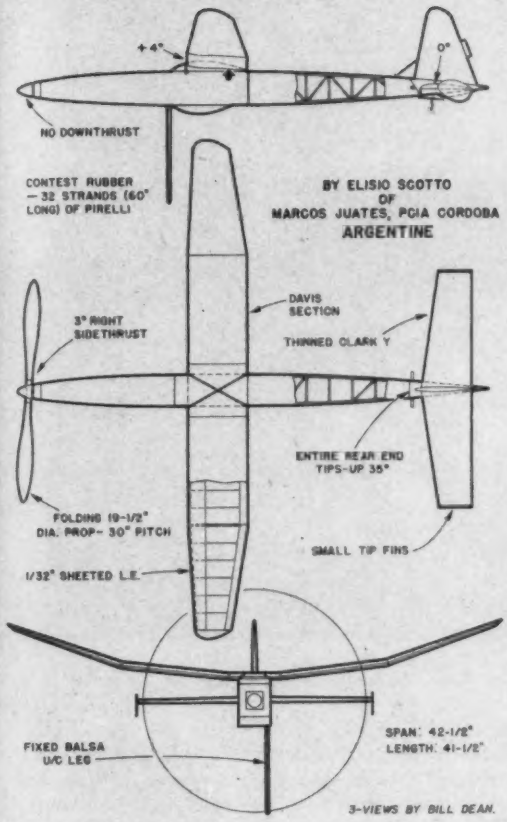
O'Donnell, one of two brothers on British team, had this interesting model, featuring semi-geodetic anti-warp construction on all surfaces.

spectively, Dave Kneeland of Missouri and Joe Foster of California. In addition, to make it a real clean sweep for Uncle Sam, the team trophies for both contests also went home with the U. S. boys (Franz Kluz Power Cup and FNA Trophy for rubber).

Although Foster finally came out top man, the actual Wakefield contest for '53 was won by no less than three countries—U. S. A., Great Britain and Argentine. How this complicated state of affairs came about we'll explain later.

Well, let's go back to the beginning and start the World Championships story from the time the modelers from the 20 competing countries first met at SMAE Headquarters (the British AMA) at Londonderry House in the heart of London. After refreshments and a general get-together, the modelers and their luggage were taken by coaches to the College of Aeronautics, Cranfield, some 45 miles north of London, where all competitors and contest officials were housed in the College buildings adjoining the airfield. The next day (Aug. 1) was devoted to contest briefing, processing and testing, with everyone concerned keeping his fingers crossed and praying that the so-far perfect weather would continue—which was asking plenty in view of the fact that 1953 has seen one of the worst British summers in living memory. To round off the day, movies were shown in the College Cinema, the highlight being a color film of the last Wakefield contest held in Britain, also at Cranfield, in '49. Hardly the thing to make the boys sleep soundly as it was so windy that year, the fliers were doing well if they managed to get airborne before the wings folded!

Far into the night, the combined talents of the editorial staffs of the "Aeromodeller" and "Model Aircraft" (plus a few others like the writer who (*Continued on page* 50)

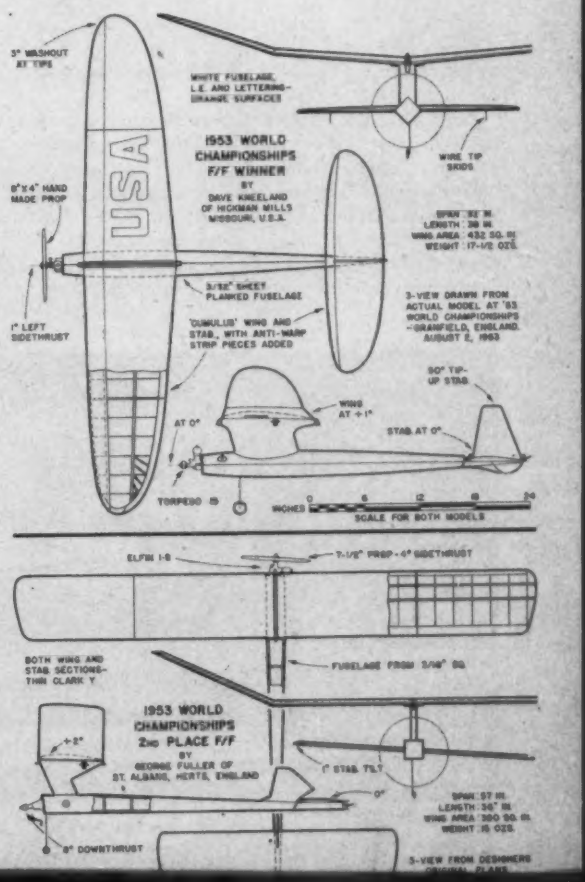


The winning U. S. Wakefield team, L to R—Carl Hermes, George Reich, Bill Fletcher (manager), Joe Foster, Cliff Montplaisir.

The winning U. S. free flight team, L to R—Stanley Hill, Carl Wheeley, Dave Kneeland, Joe Elgin. U. S. had edge in engines.

Elisee Scotto, Argentina, and his winning Wakefield. Two women took a fifth and eighth; Madame Ferber, Belgium; Mrs. Samaan, Germany.

Below—George Fuller, Britain, and his second place FAI job. See drawings on right for details of Kneeland and Fuller's winning gassies.



foxy...

by GEORGE M. ALDRICH

Twice Nats winner, once at the Internats, the man says nobody is going to catch this hot combat job. A fact!

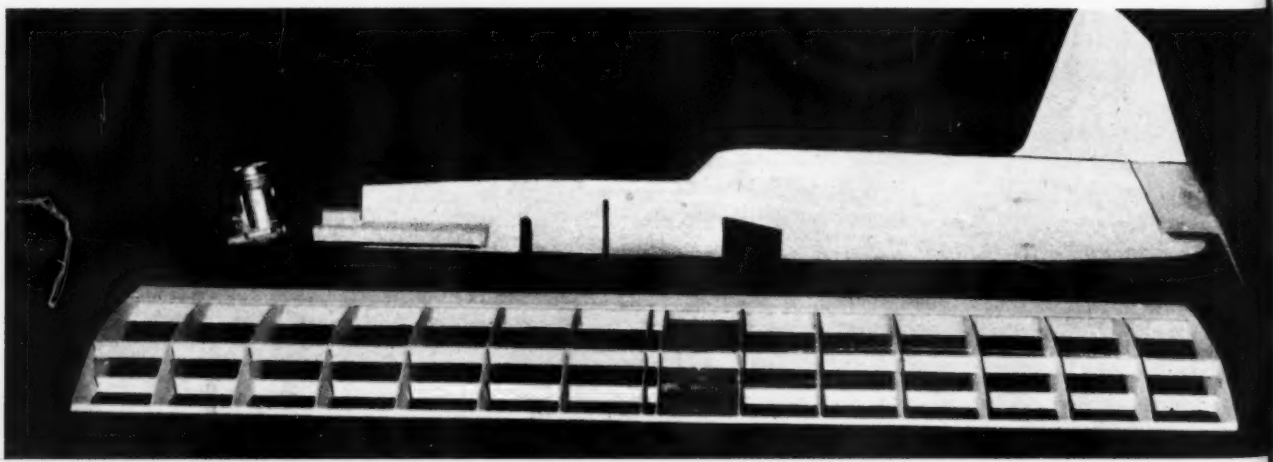
Combination of long tail moment, short nose and flaps—added after this picture was taken—gave astounding tightness of turn. On 60-foot, .014 lines, does 75-85 mph.

▸ Foxy was designed to turn sharply, smoothly, and not slow down in maneuvers. Actually four models were built, the first three without flaps, and the last with them. From Mr. Frank Zaic's year book you can see the results that I received. Mr. Zaic shows a lift curve for a NACA 23012 airfoil with and without flaps. With the flap at 0° the airfoil has a coefficient of lift of 1.0. If the flap is depressed 30° the coefficient of lift is then shown at 1.6 or .6 more than when no flap was used. This seems to me well worth the extra effort of adding flaps. The tightness of turn was so increased as to be astounding.

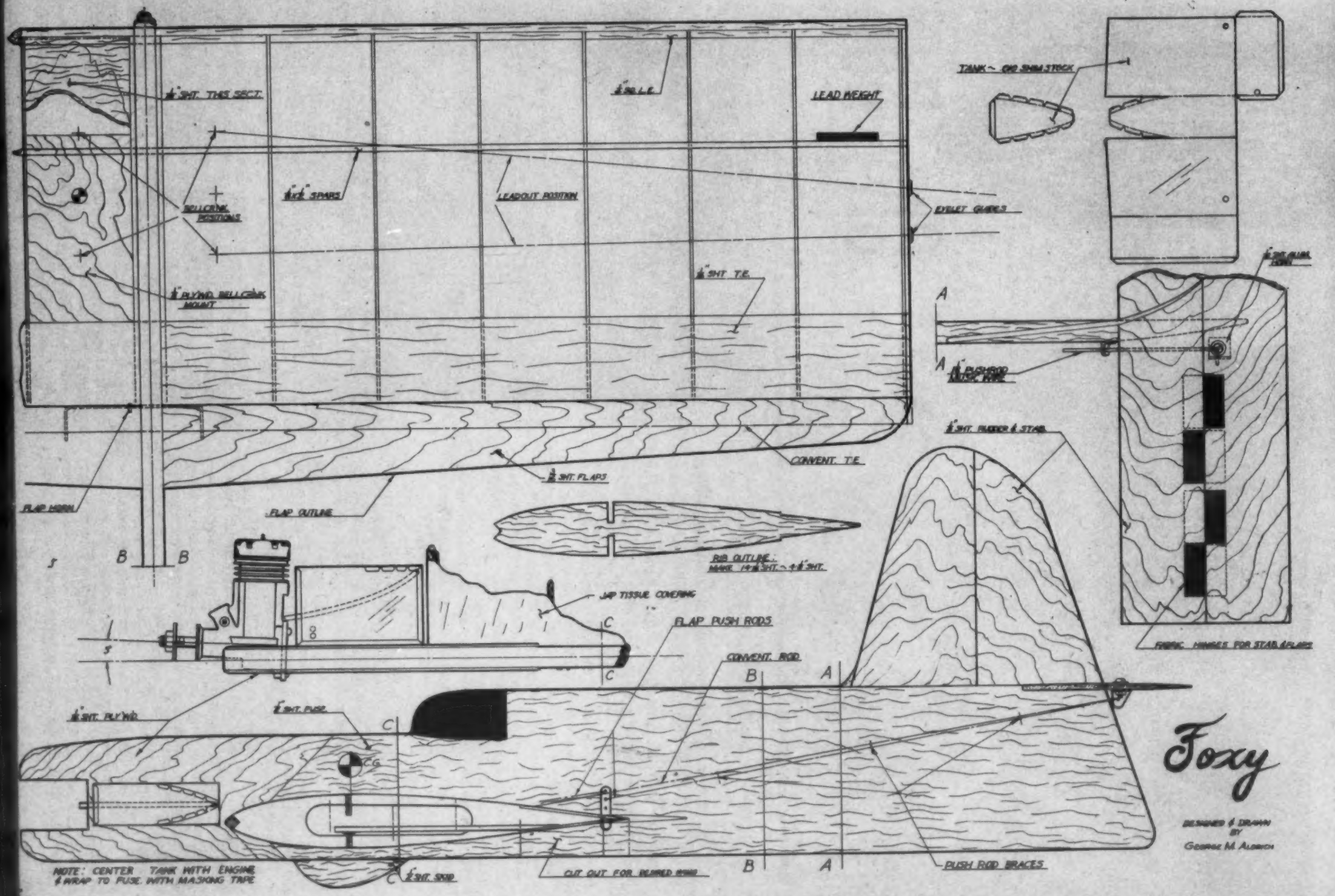
You will notice that the model has a rather long tail moment arm. Late in 1951 I started experimenting with various lengths of moment arms. Contrasting with the accepted opinion I found that the longer the moment arm (to a point) when coupled with specific nose moment arms, the more tightly and smoothly the model would turn. During these tests model performance ranged from loops that were large and wobbly, to a very tight, winding up type of maneuver.

One model in particular had a fuselage 38 in. long and a wing of 550 sq. in. Powered with .35 cu. in. engine and weighing 37 oz., it exploded on its twelfth flight while turning outside loops 10 ft. in diameter at close to 80 mph. Failure did not result from weak construction, I might add.

It can be reasoned that a model with a long tail moment and a short nose moment will have a greater moment of inertia around a given turning point. For example, suppose we take a see-saw, with two boys, one fat and one thin. To simulate a fuselage, let's set the balance point (center of gravity) off center. With the fat boy on the short end and the thin boy on the long end, we have balanced the see-saw (fuselage). Now, if we were to put another thin boy on the long end it would drop. The degree of speed with which he would drop would depend on how the moment arms are arranged. By now I'm sure you can see that placing another boy on the see-saw produces the same effect as applying a force to the tail surfaces, (*Continued on page* 44)



Plane can be built for either upright or side mounted engines; former is shown in this shot, latter on the plan. Bellcrank mount is firm.



FULL SIZE PLANS FOR BOTH "FOXY" AND "BIG TIME" AVAILABLE. SEE PAGE 52.

Seven Years with Civy Boy

Jose Tellez, president of the San Valeers, holds the latest version of this popular free flight contest airplane. Much trial and error work has gone into its various proportions.

by PAUL GILLIAM

You learn a lot of things about an airplane when you stick with it year after year. Some of it good, some of it bad. Our boy, Paul, puts it on the line in this frank discussion of the old and new.

Seven years of modeling isn't a long time. However, spending seven years of spare time with one basic concept of a free flight design is a long time. We shall not try to prove that it was better to stay with one design for a given number of years in comparison with some prolific modeler-designers who create and scuttle a dozen different ships in one contest season.

Most of us are in no position to say which route is the better to follow. At the same time, let us also consider that much can be learned from one design, if one can keep burning the midnight oil in boring building sessions, constructing the same basic ship with only small changes in any one model.

As modelers, we know that the materials we use are not always the same. Added to this, we are also aware that very little practical aerodynamic data for low speed free flight models is available to us, the model builders. This has created the challenge that we can call model aviation.

The author sincerely hopes that the story of the Civy Boy will be an interesting one to the new and old modeler alike. This story will tell how and why the Civy Boy design began. More important, it is a story told frankly, to illustrate the achievements, which might be questionable, and the mistakes that we know as fact, in one free flight design over a seven-year period.

It is likely that full description of each and every experimental phase of this design since its beginning would be boring. For this reason, only the main issues will be fully covered from the basic original. The changes in the design will be designated GOOD or BAD.

The Civy Boy design was naturally based on ideas of

This is the Super Civy Boy 61. Civy Boys have been constructed for all sizes and degrees of power, from the 20-inch jobs to 95-inch behemoths.

leading model designers in the 1938 to 1941 modeling era. Like many other modelers, I had built and flown successfully all of Carl Goldberg's outstanding designs, as, for example, the Zipper and the Sailplane.

In 1946, the first Civy Boy was built as a smooth cambered pylon model, much in the manner of Goldberg's designs, but with the addition of three relatively unproven ideas: 1. 100 per cent CG location or balancing model on trailing edge of wing; 2. 50 per cent (of wing area) lifting stabilizer; 3. Long tail movement (60 per cent of wing span). The addition of these three principles sparked outstanding performance. It indicated a step toward optimum performance if it were possible to improve Goldberg's famous Zipper arrangement.

Since Civy Boys have been built in almost every conceivable usable size or class from 20 in. to 95 in., we will use a

Class B Version of 575 sq. in. for all references and explanations in this article.

Before 1947, almost all models were powered with engines using a standard spark plug and breaker points, each connected in a circuit to a coil, condenser, and flight batteries. The reference made at this time to our old spark coil ignition engines may seem to be irrelevant to the point of our article, but it is a very important part of this Civy Boy story. Please remember this paragraph. Later in this article it is possible to see how our old spark ignition engines, compared with the present day simple glow plug engines, affect the design and inherent stability of a free flight gas ship.

The 1946 Civy Boy was a spark ignition model using a 6 to 1 aspect ratio on the wing and an original airfoil. This airfoil can be compared with a thinned Goldberg airfoil and bears some similarity in part of the airfoil curve to an NACA 6409 section.

To prevent repetition in this writing, it is best to state here that this mentioned airfoil was used on all Civy Boys from 1946 to 1952. There were a few slight modifications of the wing airfoil over this period, but actually it has never seemed to make much difference in model performance if the airfoil thickness does not vary more than two per cent.

The 1947 Civy differed from the 1946 version only in pylon height. The 1947 models were built with a 10 per cent lower pylon. This change in pylon height made no change in glide performances, but the model flew with less downthrust under power.

In 1948 we come to the big change. The glow plug had been commercially produced. Nearly all modelers readily hailed the glow plug as a simplifier of modeling, thereby throwing out the work shop window all the fuss and bother with coils, flight batteries, and wiring diagrams. At this time it is very possible that we may also have thrown our best designs out the window.

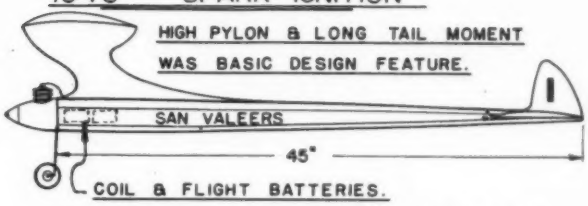
Yes, the glow plug and its simplicity were welcomed. Nearly all of us could see how a simple glow engine could encourage modeling. This was especially true for the younger modeler, for whom wiring a model for spark coil ignition was a nightmare of short circuits and faulty solder joints.

Then, naturally, we can expect that the 1948 Civy Boy was glow engine powered. This glow version was 5 oz. lighter without the flight batteries, coil, etc. We did then what most modelers thought best: built the 5 oz. *into* the model to make it stronger. But this time, even though 5 oz. were added to model structure, the location of the weight was not near the engine, but fairly well distributed as an over-all "beef-up" over the entire model.

It will be easy to understand that this glow engine model was very tail heavy, and in *(Continued on page 45)*

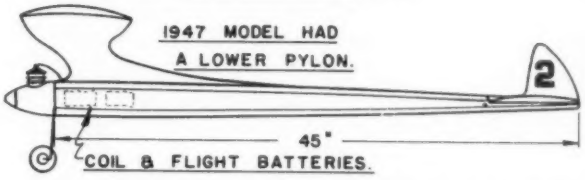
Over-the-shoulder launch of one of the long-nosed 74's in MAN for October, 1949. New, shorter nosed version for '53 has shorter tail moment.

1946 – SPARK IGNITION



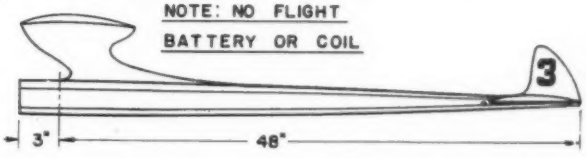
THIS SPARK IGNITION MODEL HAD A LONG TAIL MOMENT WITH A SHORT NOSE MOMENT.

1947 – SPARK IGNITION



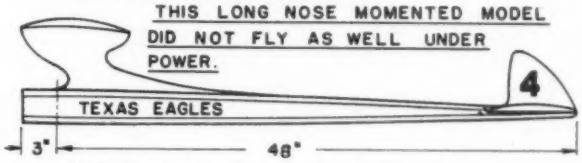
COIL & BATTERY WEIGHT FORWARD OF C.G. ALLOWED LONG TAIL MOMENT & SHORT NOSE MOMENT.

1948 - 1949 GLOW IGNITION



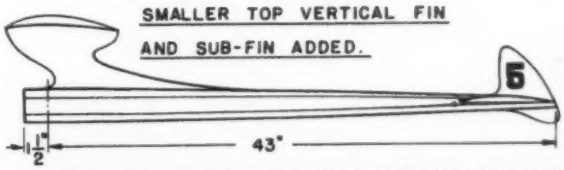
A LONG NOSE HAD TO BE ADDED TO THE FORWARD FUSELAGE OF THE 1948-1949 CIVY-BOY TO BALANCE LOSS OF WEIGHT AFT OF C.G.

1950 - GLOW IGNITION



MORE VERTICAL FIN WAS ADDED TO THIS MODEL TO HELP OFF-SET LATERAL AREA OF LONG NOSE ADDED FORWARD OF C.G.

1951 - 1952 GLOW IGNITION

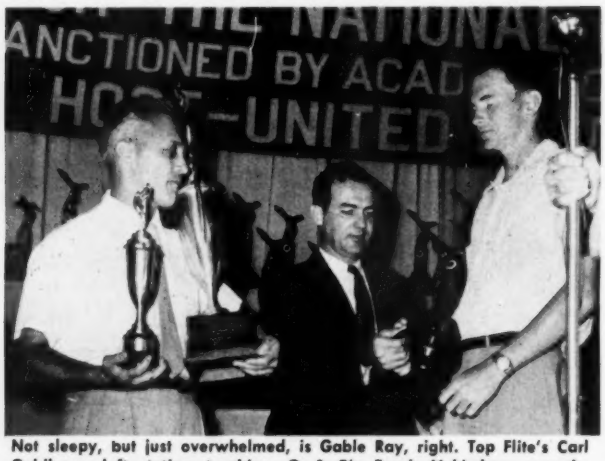


THE TAIL MOMENT OF THIS VERSION OF THE CIVY BOY WAS SHORTENED TO PERMIT SHORTER NOSE MOMENT.

1953 nationals

The 22nd National Model Airplane Championships, held July 27-August 2, were the biggest since the war. Approximately 1,200 entrants flew in thirty-odd events but looked lost when scattered about the huge Naval Air Station, Willow Grove, Pa. Indoors ran off at the famous lighter-than-air station, Lakehurst, N.J. Weather was hot and cold, was calm and windy. Despite sunburn, lame arms, and skinned knuckles, the modelers broke records galore. The Navy was host; meet was sponsored, directed by National Exchange Club.

Smiling Burt Nelson receives the Testor Award for best finish from Frank Brophy of that company. Anybody who wins this trophy really deserves it.



Not sleepy, but just overwhelmed, is Gable Ray, right. Top Flite's Carl Goldberg, left, toting trophies; O & R's Frank Nekimkem awards.

A real table of champions; L to R: Woody Blanchard, Open; William White, Junior; Steward Savage-Ronald Plotzke, Senior (tie). J. B. Brick.

If I can't go to Europe, I'll win it here, reasoned Bob Hatschek, who took Wakefield, ending up with Berkeley Award and one of the MAN trophies.

McCoy's popular Keith Storey honored as industry member who did most for modeling in 1953. Bill Effinger awards binoculars—these we need!

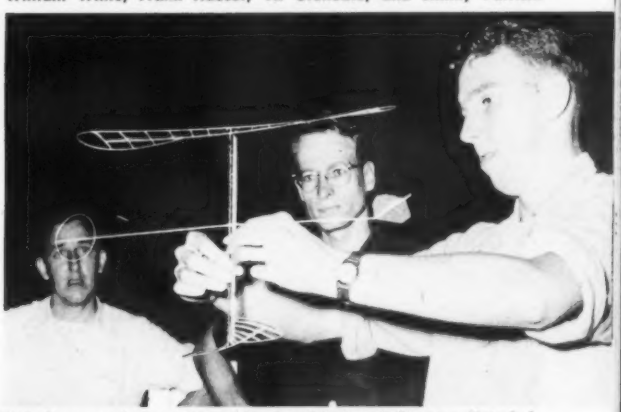
For win in Class B free flight, Harry Capper took home monster trophy. 'Twas rumored about that Nekimkem suffered a Charlie Horse from lifting hardware.

Hal Roth, right, whose Clipper Cargo lifted over 23 ounces, shares jubilation with PAA's George Gardner, awarding nifty watch.

Mexican team—Federacion Mexicana de Aeromodelismo. These boys always have outstanding airplanes, well built and beautifully finished. Can fly 'em, too.

Team winners from California: L to R—Joseph White, Carl Curtis, William White, Frank Hauser, Al Grenoble, and Jimmy Parrish.

Talented pair ready a big indoor stick. That's Joe Bilgri, well known Wakefielder, left, and Carl "the arm" Rambo. Joe was second to 30-minute Andrews.



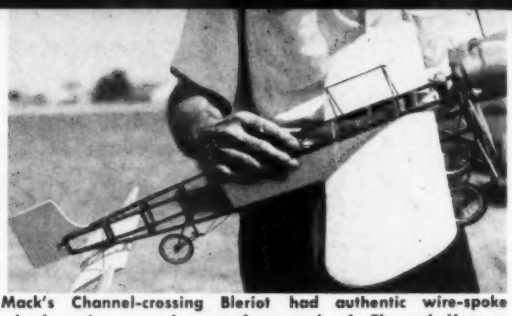
Dick Querman being released by novel indoor helicopter. Hatschek and Bob Querman look on with, shall we say, mixed emotions?

Navy's carrier event produces all kinds of planes but never before one like this scale Cutlass, Dynajet power. Unfortunately, it was first and last hop.

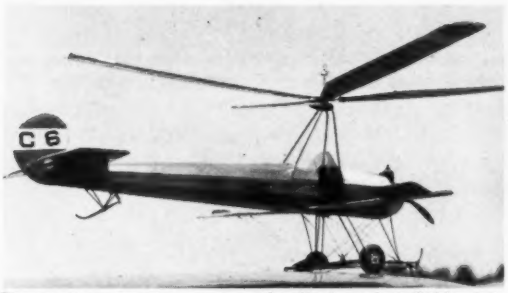
Talking over speed with Bob Elliott is, L to R, background, Larry Parkerson, Harris Grismer, Bob McConnell; all are southern boys.

1953 NATIONALS CONTINUED

He likes them old, he likes them scale, says C. W. Mack, from Chester, N. J., who showed up with bevy of fascinating ancient crates, like this Cub-powered job.



Mack's Channel-crossing Bleriot had authentic wire-spoke wheels, wire trussed open framework. A Thermal Hopper.



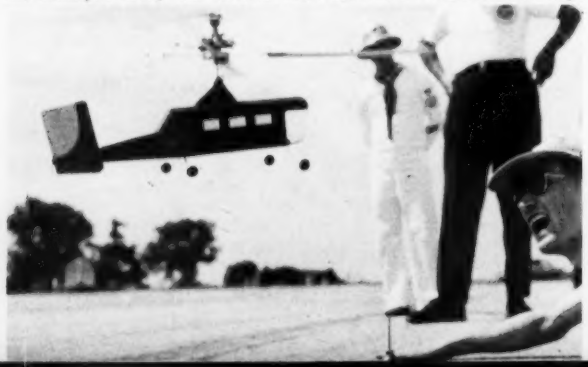
Cierva autogyro, no less, was another Mack product. Guide plate on far wing indicates this interesting machine is flown as ukie.

Really churning up a spray, Don Kubina's Zeke begins a take-off. Power was a Cub .14. Zekes, Hogans, Fubars, go on forever. Experimentals also.

Staff Sergeant M. R. Lipsey, a Sheppard Air Force Base member of the Air Force team, waves the go-ahead to launcher of this Jasco Nordic glider.

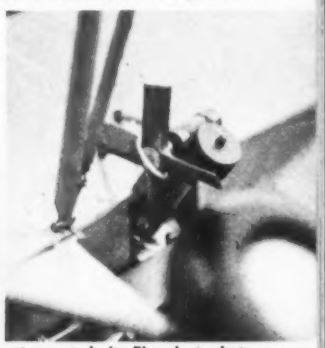
And the inevitable long gliding Civy Boys do their stuff. Here's Bill Killough of Texas Eagles with a Civy Boy 61, and a K & B Torpedo .32. Everything-that-goes-up thesis gets an acid test from Parnell Schoenky, the helicopter man, who took the new Hiller event with realistic ship.

Tired pilot of Bob Yeoman's SBD-6 sits out his turn to fly. Note that scale cockpit and sliding canopy. A Mac .49 makes this machine get up and go. The stunt event continues to attract better built, and better looking, ships. Fox 59 in this original is being cranked by its flier Richard Sarpolus.



Master builder of them all is Tom Dean. Cameron .19, Aeronca Duster had simulated tube fuselage framework, even same coats of dope as big ship.

His control leads hooked into scale system inside airplane. The wheel brakes operated from inside ship; brake linings worked. And it flies. What a gamble!



Above—With door removed, you can see scale seat, belt. The dust chute below fuselage is authentic. Right—Wind driven power unit for the dust.

A great experimenter, Larry Conover, here hand launches excellent flying ornithopter.

Unlimited rubber flown for the first time at a Nats. Rudy Aukschun shows good form.

Macnabb's eyes popped: Jack Williams, Claude McCullough, try things while helper sights.

PAA-Load rubber job with 54-inch pitch on a 10-inch diameter prop. F. E. Warnock flew this ship.

Easterners brought families for treat. Mr. and Mrs. Ernest, Laraine, Richard — model, Deadly Earnest.

One of nation's most popular classes, free flight scale is so-so at Nats. Bruno Markiewicz releases Fokker D-8.

The Elf engines have been manufactured since well before the war, in single, twin, four, and six-cylinder arrangements. This in RC at the Nats.

Geared Mac .60 to drive counter-rotating props on RC speed job by Bill MacKerracher. This plane flown better than 100 mph; Rockwood.

what is Performance?

by TED MARTIN

This authoritative and intriguing discussion of factors that decide an engine's particular kind of performance lays the groundwork for an extraordinary series of articles soon to be published.

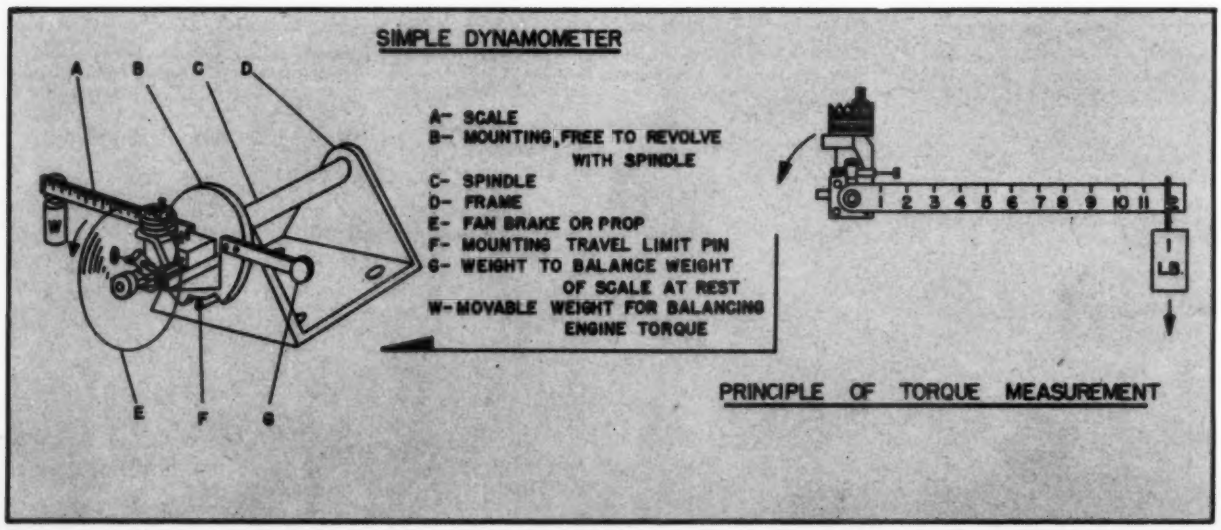
In the good old days of model engines we found that a motor either had "pep" or it didn't. We knew just where we stood, and paid for "pep" according to quantity.

In these enlightened times we don't know, most of the time, what we are getting. We are belabored and bewildered with torque, bhp, bmep, rpm, volumetric efficiency, bhp per liter, power/weight ratio, etc., etc., and on the whole treated like doctors of engines, when all most of us want is a few dollars worths of urge for our modest piece of balsa butchery.

The fact is that the modern model engine is so highly developed that, power for size, it leaves its full size counterpart right in the shade, and produces "pep" in a variety of different forms each of which is peculiarly suited to a definite application, and therefore requires distinguishing names.

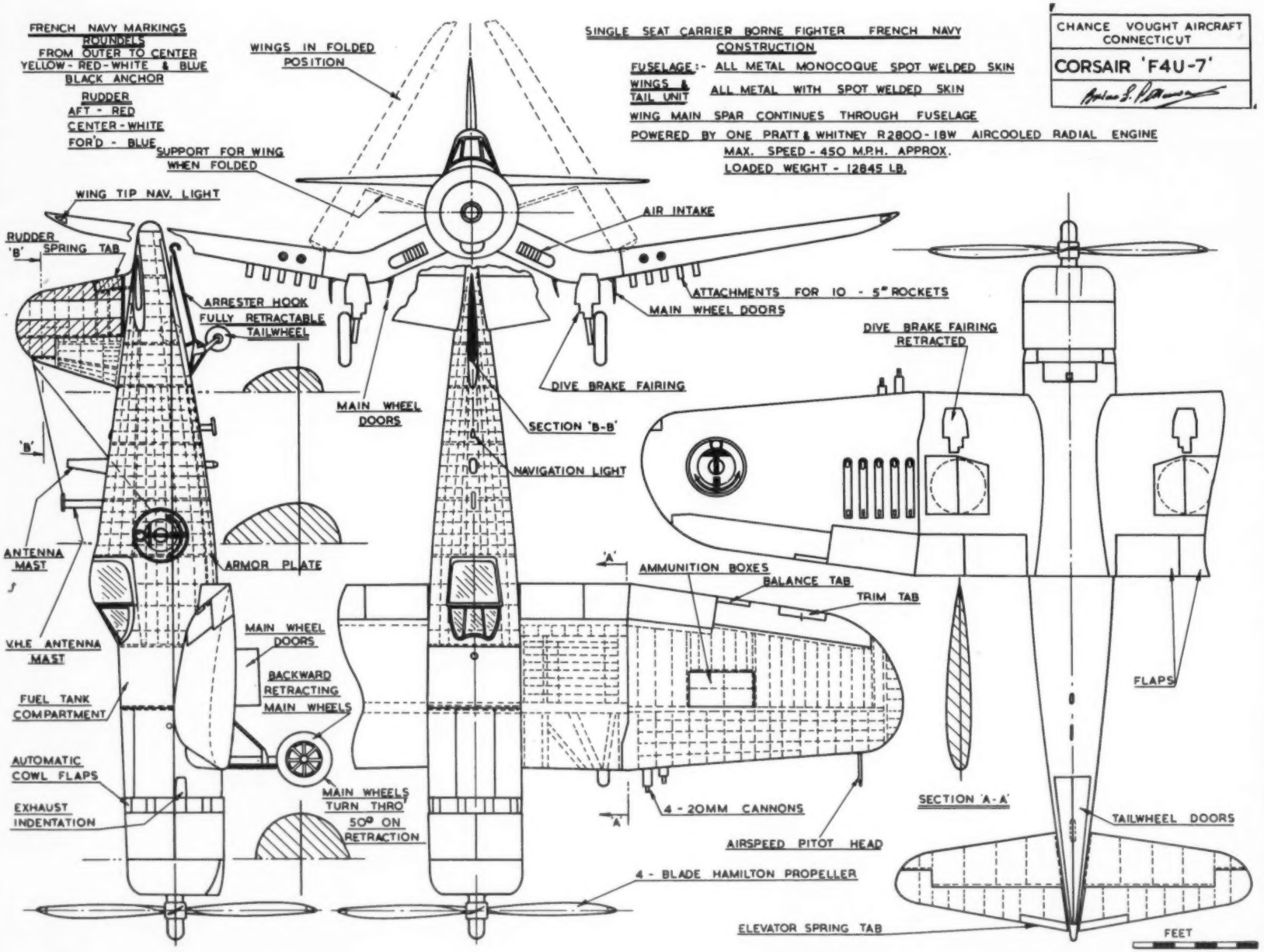
In order to describe what kind of "pep" a particular engine has to offer, the use of technical language is becoming more and more common in modelers' jargon, and it is useful to know the significance and meaning of the words, apart from which a dash of long haired discussion at the flying field will often inspire due respect in the inevitable Sunday onlookers and may even keep their feet off your lines.

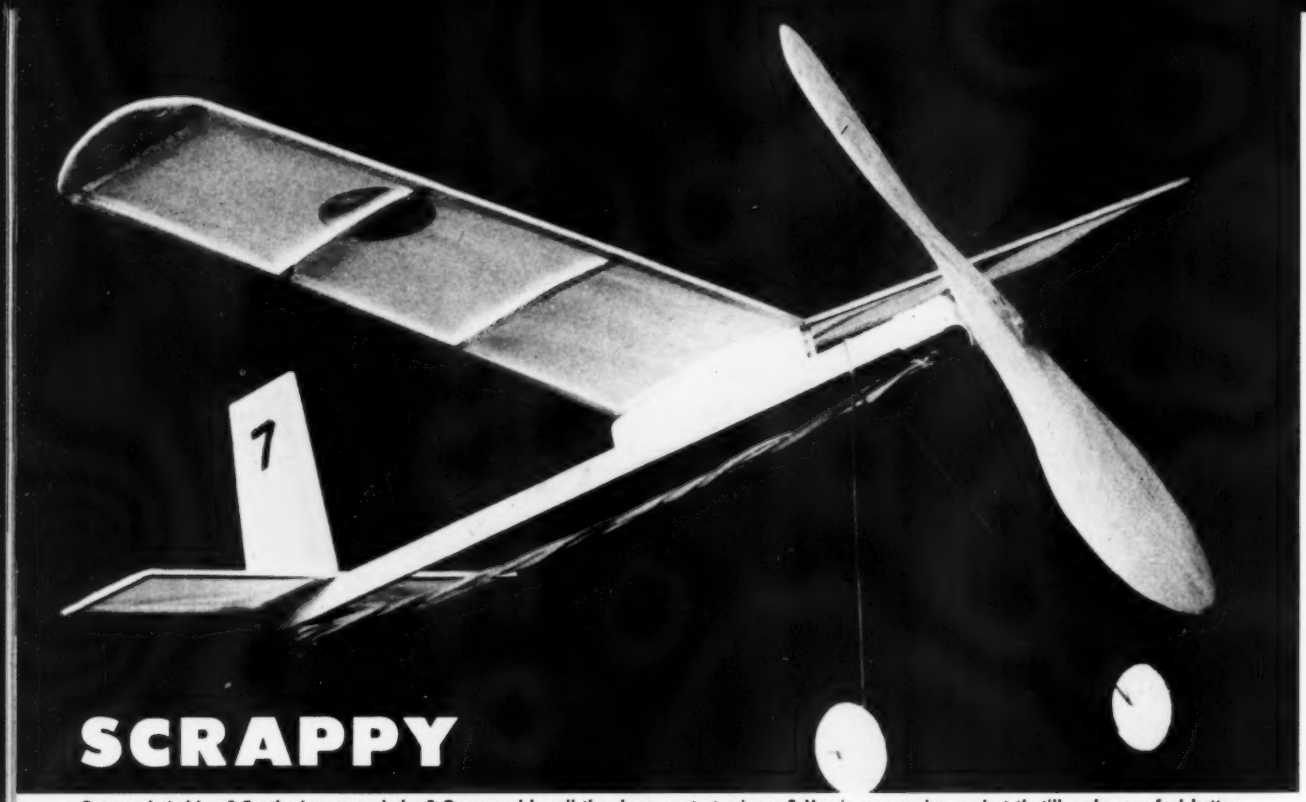
(*Continued on page* 36)



These sketches by the author show, left, set-up needed to measure torque accurately. On the right, principle of measurement is illustrated.

Planes Worth Modeling — CORSAIR





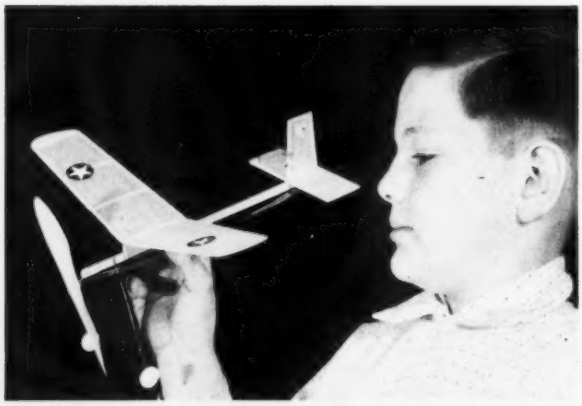
SCRAPPY

Got geodetic blues? Feathering prop shakes? Overawed by all the sharp contest winners? Here's an evening project that'll make you feel better.

by DICK EALY

Maybe grandpaw built a model like this one, but the so-called Baby ROG is just as much fun as it ever was. Build it from scraps. Scrappy. Get it?

The small rise-off-ground model is something that all novices should build as one of their first model airplanes. It's simple to build and from the experience gained flying the ROG you will learn the basic adjustments for successful flight. Little tricks like warping a wing or rudder will cause the model to respond in different ways. Try circling it to the left by warping left rudder and, the trailing edge of left wing down, reverse procedure and fly to right. Make your ROG a flying laboratory and it will help you later to fly successfully more difficult airplanes.



Junior here approves the whole idea. Rubber motor requires only two strands 1/8 inch rubber, nine inches long. No broken piggy banks for this.

Some of you more experienced fellows will find it fun to build the ROG in a few hours and the beauty of it is you can fly it right out in front of your house. All your pals will want to fly it, too!

All the wing, tail and rudder stock is 1/16 x 1/8 in. medium balsa. Make wing first. The right half is shown so make the left half opposite to that. Pin spars down and cut ribs to fit, then use a round pencil to roll airfoil camber on underside of each rib and cement in place.

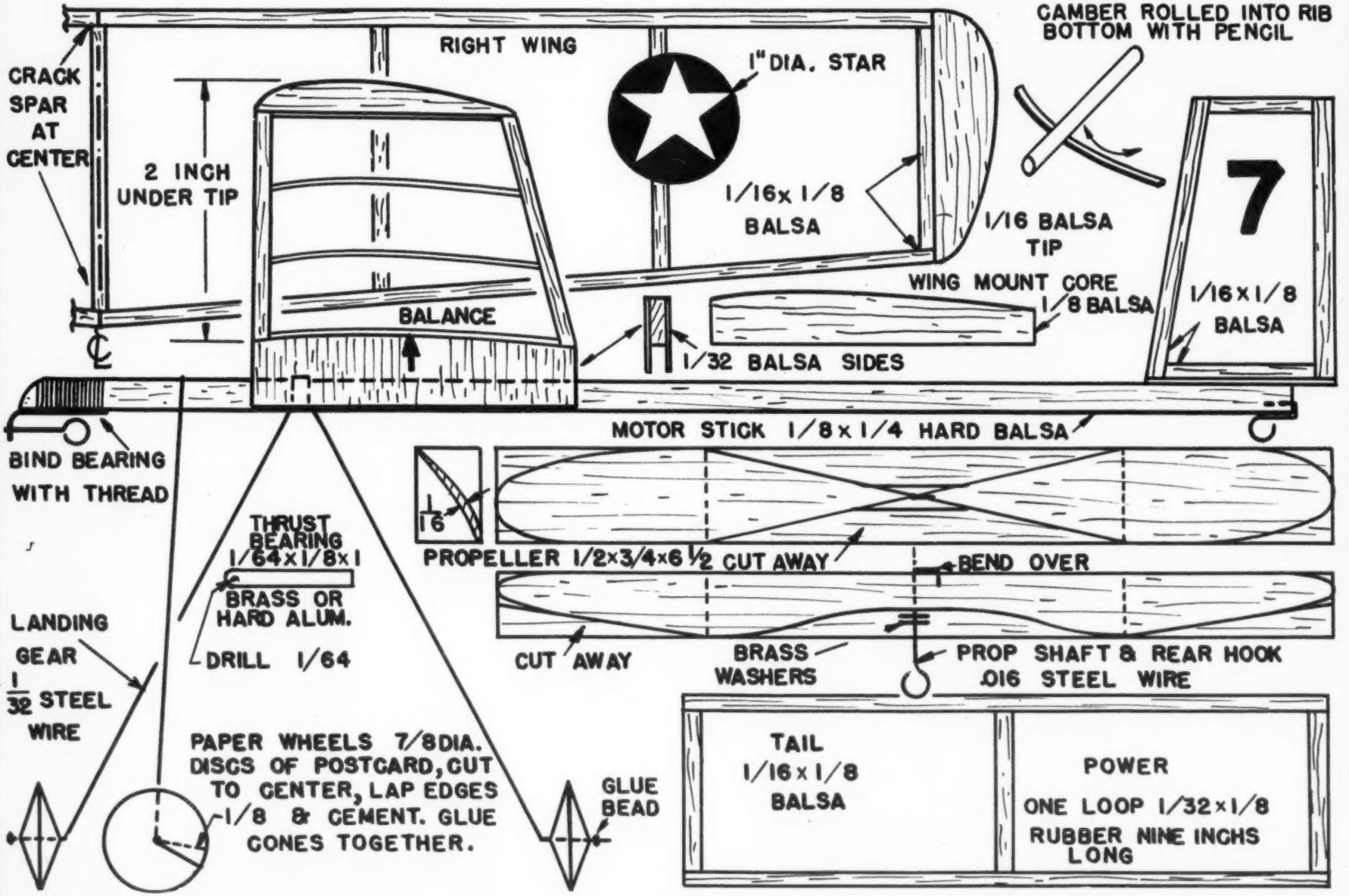
Omit the center rib at this point. Trim spar ends off and cement 1/16 x 1/2 in. balsa wingtips. Crack spars by notching at center and raising one tip 4 in. which is equal to 2 in. on each side. Prop tip up with a block, add center rib and cement joint with two coats of cement. Wing mount is a 1/8 x 7/16 x 2-1/2 in. balsa core (can be cut from 1/8 sheet) with 1/32 sheet balsa cemented to each side. Grain runs horizontally on core and vertically on sides. Cement mount to wing. Cover wing with Jap tissue (or other light tissue) using clear Testors dope for adhesive.

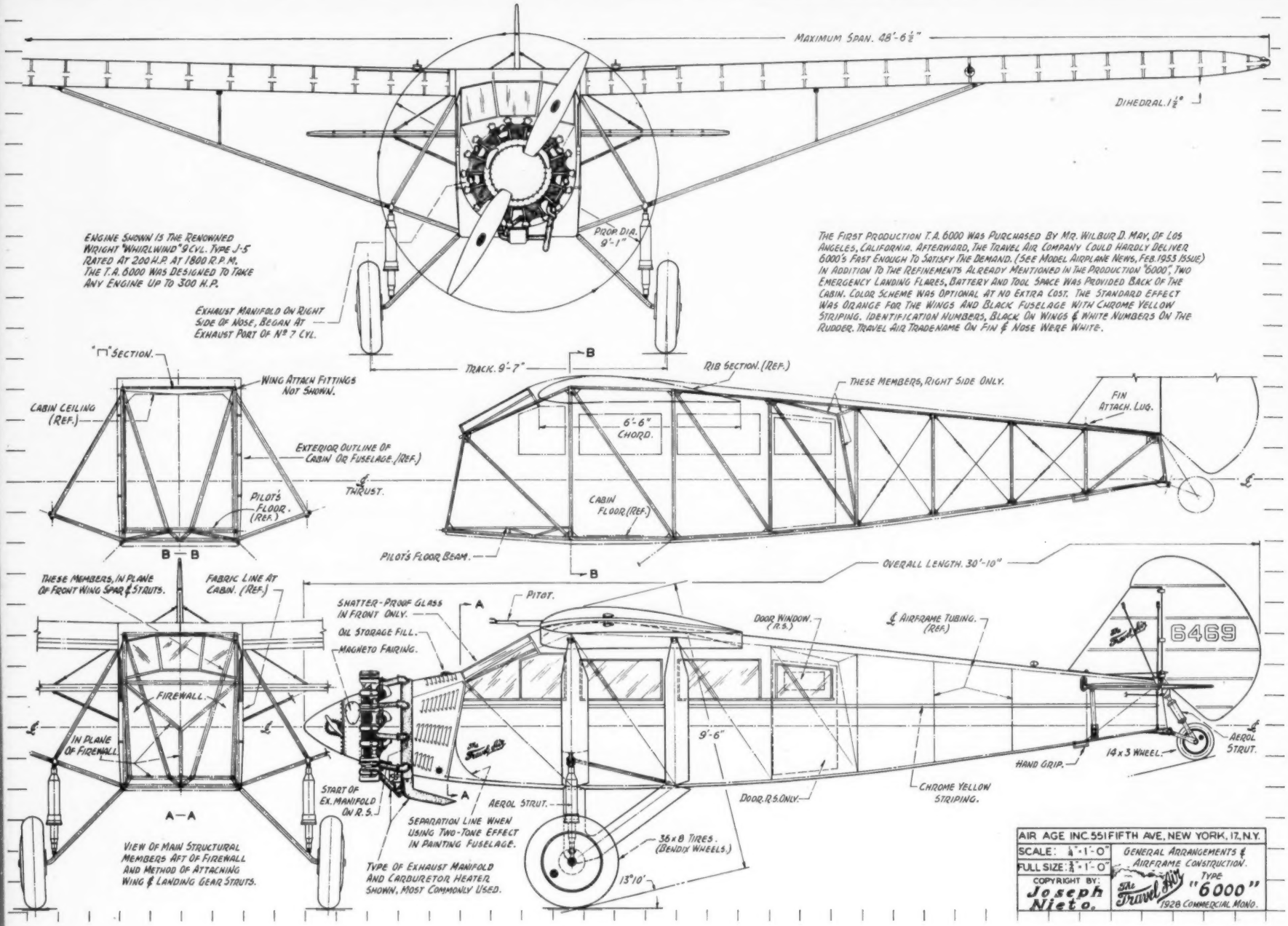
Tail and rudder frames come next. Cover with Jap tissue. Cement rudder to tail.

Motor stick is hard 1/8 x 1/4 x 9-7/8 in. balsa. Make or buy thrust bearing and lash to stick with thread and cement. Bend up wire rear hook and cement in place. Make landing gear and cement in place. Cement tail on top of motor stick.

Propeller block measures 1/2 x 3/4 x 6-1/2 in. medium balsa. Draw pencil lines as shown and carve away to lines. Carve underside of blade and sandpaper smooth with No. 1/0. Then carve top side of blade and sand. Trim blade as shown. Sand with No. 1/0 and then with No. 400. Bend wire shaft and insert through rear of hub. Bend front end over and force into prop and cement. Place two washers on shaft and insert through hole in bearing.

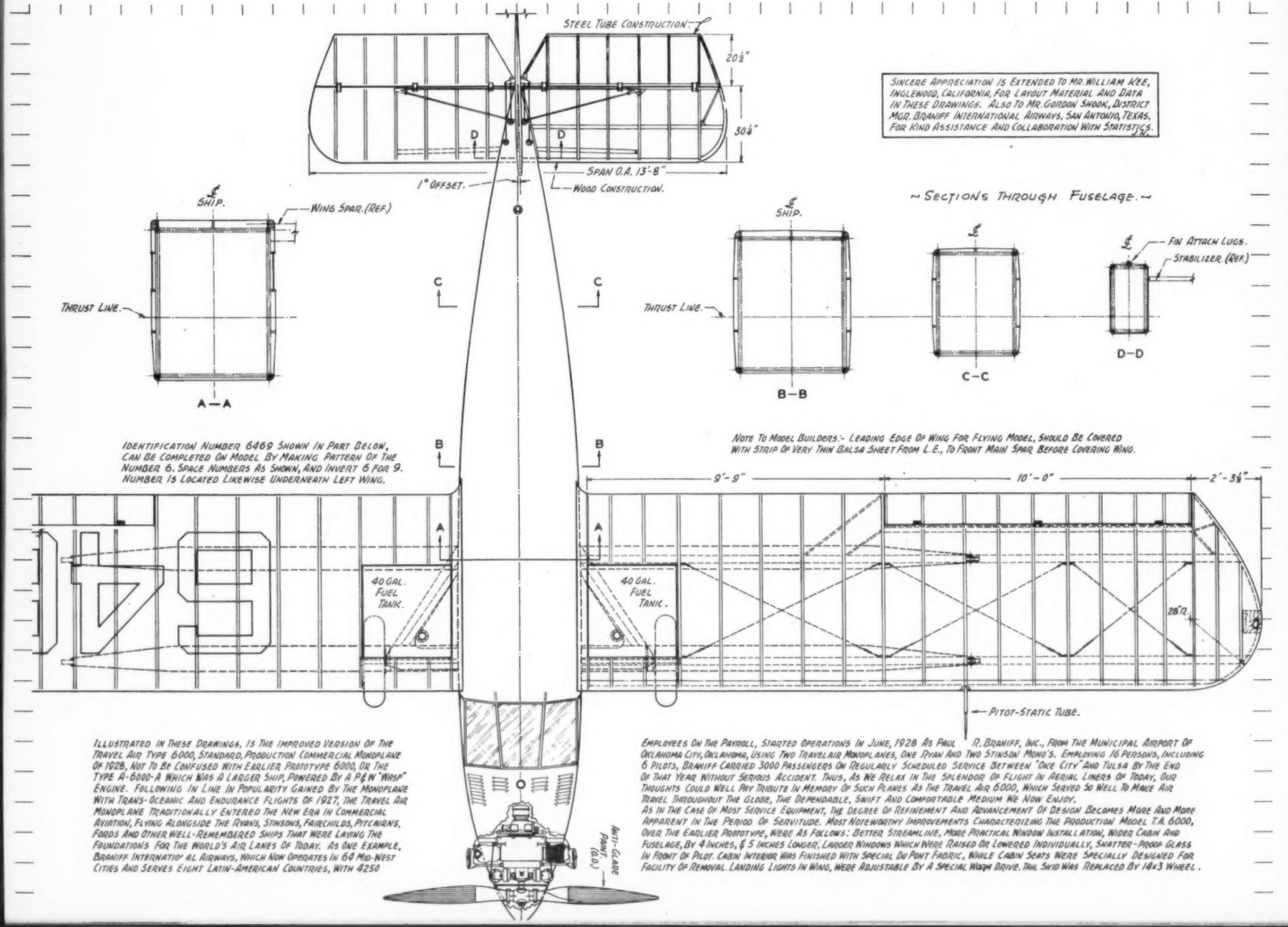
Rubber motor is two strands of 1/8-in. rubber 9 in. long. Find balance point of assembled stick and place wing over this so that a point one-half of chord is above. Hand glide model and trim by moving wing forward if nose-heavy or back if tail-heavy.


RIGHT WING
1" DIA. STAR
CAMBER ROLLED INTO RIB BOTTOM WITH PENCIL
CRACK SPAR AT CENTER
2 INCH UNDER TIP
1/16x 1/8 BALSA
1/16 BALSA TIP
7
1/16x1/8 BALSA
WING MOUNT CORE 1/8 BALSA
BALANCE
1/32 BALSA SIDES
MOTOR STICK 1/8x1/4 HARD BALSA
BIND BEARING WITH THREAD
THRUST BEARING 1/64x1/8x1
BRASS OR HARD ALUM.
DRILL 1/64
1/16
PROPELLER 1/2x3/4x6 1/2 CUT AWAY
BEND OVER
LANDING GEAR 1/32 STEEL WIRE
CUT AWAY
BRASS WASHERS
PROP SHAFT & REAR HOOK .016 STEEL WIRE
TAIL 1/16x1/8 BALSA
POWER
ONE LOOP 1/32x1/8 RUBBER NINE INCHS LONG
PAPER WHEELS 7/8 DIA. DISCS OF POSTCARD, CUT TO CENTER, LAP EDGES 1/8 & CEMENT. GLUE CONES TOGETHER.
GLUE BEAD


MAXIMUM SPAN. 48'-6½"
DIHEDRAL. 1½°
PROP. DIA. 9'-1"
ENGINE SHOWN IS THE RENOWNED WRIGHT "WHIRLWIND" 9 CYL. TYPE J-5 RATED AT 200 H.P. AT 1800 R.P.M. THE T.A. 6000 WAS DESIGNED TO TAKE ANY ENGINE UP TO 300 H.P.
EXHAUST MANIFOLD ON RIGHT SIDE OF NOSE, BEGAN AT EXHAUST PORT OF No. 7 CYL.
THE FIRST PRODUCTION T.A. 6000 WAS PURCHASED BY MR. WILBUR D. MAY, OF LOS ANGELES, CALIFORNIA. AFTERWARD, THE TRAVEL AIR COMPANY COULD HARDLY DELIVER 6000's FAST ENOUGH TO SATISFY THE DEMAND. (SEE MODEL AIRPLANE NEWS, FEB. 1953 ISSUE) IN ADDITION TO THE REFINEMENTS ALREADY MENTIONED IN THE PRODUCTION "6000", TWO EMERGENCY LANDING FLARES, BATTERY AND TOOL SPACE WAS PROVIDED BACK OF THE CABIN. COLOR SCHEME WAS OPTIONAL AT NO EXTRA COST. THE STANDARD EFFECT WAS ORANGE FOR THE WINGS AND BLACK FUSELAGE WITH CHROME YELLOW STRIPING. IDENTIFICATION NUMBERS, BLACK ON WINGS & WHITE NUMBERS ON THE RUDDER. TRAVEL AIR TRADENAME ON FIN & NOSE WERE WHITE.
TRACK. 9'-7"
"□" SECTION.
WING ATTACH FITTINGS NOT SHOWN.
CABIN CEILING (REF.)
EXTERIOR OUTLINE OF CABIN OR FUSELAGE. (REF.)
℄ THRUST.
PILOT'S FLOOR. (REF.)
B — B
RIB SECTION. (REF.)
THESE MEMBERS, RIGHT SIDE ONLY.
FIN ATTACH. LUG.
6'-6" CHORD.
CABIN FLOOR. (REF.)
PILOT'S FLOOR BEAM.
OVERALL LENGTH. 30'-10"
THESE MEMBERS, IN PLANE OF FRONT WING SPAR & STRUTS.
FABRIC LINE AT CABIN. (REF.)
SHATTER-PROOF GLASS IN FRONT ONLY.
OIL STORAGE FILL.
MAGNETO FAIRING.
PITOT.
DOOR WINDOW. (R.S.)
℄ AIRFRAME TUBING. (REF.)
6469
FIREWALL.
IN PLANE OF FIREWALL
9'-6"
AEROL STRUT.
14 x 3 WHEEL.
HAND GRIP.
CHROME YELLOW STRIPING.
DOOR. R.S. ONLY.
START OF EX. MANIFOLD ON R.S.
SEPARATION LINE WHEN USING TWO-TONE EFFECT IN PAINTING FUSELAGE.
36 x 8 TIRES. (BENDIX WHEELS.)
13'10"
A — A
VIEW OF MAIN STRUCTURAL MEMBERS AFT OF FIREWALL AND METHOD OF ATTACHING WING & LANDING GEAR STRUTS.
TYPE OF EXHAUST MANIFOLD AND CARBURETOR HEATER SHOWN, MOST COMMONLY USED.

AIR AGE INC. 551 FIFTH AVE, NEW YORK, 17, N.Y.

SCALE: ¼" = 1'-0"	GENERAL ARRANGEMENTS & AIRFRAME CONSTRUCTION.
FULL SIZE: ⅜ = 1'-0"	
COPYRIGHT BY: Joseph Nieto.	The Travel Air TYPE "6000" 1928 COMMERCIAL MONO.



SINCERE APPRECIATION IS EXTENDED TO MR. WILLIAM KEE, INGLEWOOD, CALIFORNIA, FOR LAYOUT MATERIAL AND DATA IN THESE DRAWINGS. ALSO TO MR. GORDON SHOOK, DISTRICT MGR. BRANIFF INTERNATIONAL AIRWAYS, SAN ANTONIO, TEXAS, FOR KIND ASSISTANCE AND COLLABORATION WITH STATISTICS.

~ SECTIONS THROUGH FUSELAGE. ~

IDENTIFICATION NUMBER 6469 SHOWN IN PART BELOW, CAN BE COMPLETED ON MODEL BY MAKING PATTERN OF THE NUMBER 6. SPACE NUMBERS AS SHOWN, AND INVERT 6 FOR 9. NUMBER IS LOCATED LIKEWISE UNDERNEATH LEFT WING.

NOTE TO MODEL BUILDERS:- LEADING EDGE OF WING FOR FLYING MODEL, SHOULD BE COVERED WITH STRIP OF VERY THIN BALSA SHEET FROM L.E., TO FRONT MAIN SPAR BEFORE COVERING WING.

ILLUSTRATED IN THESE DRAWINGS, IS THE IMPROVED VERSION OF THE TRAVEL AIR TYPE 6000, STANDARD, PRODUCTION COMMERCIAL MONOPLANE OF 1928, NOT TO BE CONFUSED WITH EARLIER PROTOTYPE 6000, OR THE TYPE A-6000-A WHICH WAS A LARGER SHIP, POWERED BY A P & W "WASP" ENGINE. FOLLOWING IN LINE IN POPULARITY GAINED BY THE MONOPLANE WITH TRANS-OCEANIC AND ENDURANCE FLIGHTS OF 1927, THE TRAVEL AIR MONOPLANE TRADITIONALLY ENTERED THE NEW ERA IN COMMERCIAL AVIATION, FLYING ALONGSIDE THE RYANS, STINSONS, FAIRCHILDS, PITCAIRNS, FORDS AND OTHER WELL-REMEMBERED SHIPS THAT WERE LAYING THE FOUNDATIONS FOR THE WORLD'S AIR LANES OF TODAY. AS ONE EXAMPLE, BRANIFF INTERNATIO' AL AIRWAYS, WHICH NOW OPERATES IN 6 MID-WEST CITIES AND SERVES EIGHT LATIN-AMERICAN COUNTRIES, WITH 4250 EMPLOYEES ON THE PAYROLL, STARTED OPERATIONS IN JUNE, 1928 AS PAUL R. BRANIFF, INC., FROM THE MUNICIPAL AIRPORT OF OKLAHOMA CITY, OKLAHOMA, USING TWO TRAVELAIR MONOPLANES, ONE RYAN AND TWO STINSON MONO'S. EMPLOYING 16 PERSONS, INCLUDING 6 PILOTS, BRANIFF CARRIED 3000 PASSENGERS ON REGULARLY SCHEDULED SERVICE BETWEEN "OKE CITY" AND TULSA BY THE END OF THAT YEAR WITHOUT SERIOUS ACCIDENT. THUS, AS WE RELAX IN THE SPLENDOR OF FLIGHT IN AERIAL LINERS OF TODAY, OUR THOUGHTS COULD WELL PAY TRIBUTE IN MEMORY OF SUCH PLANES AS THE TRAVEL AIR 6000, WHICH SERVED SO WELL TO MAKE AIR TRAVEL THROUGHOUT THE GLOBE, THE DEPENDABLE, SWIFT AND COMFORTABLE MEDIUM WE NOW ENJOY.

AS IN THE CASE OF MOST SERVICE EQUIPMENT, THE DEGREE OF REFINEMENT AND ADVANCEMENT OF DESIGN BECOMES MORE AND MORE APPARENT IN THE PERIOD OF SERVITUDE. MOST NOTEWORTHY IMPROVEMENTS CHARACTERIZING THE PRODUCTION MODEL T.A. 6000, OVER THE EARLIER PROTOTYPE, WERE AS FOLLOWS: BETTER STREAMLINE, MORE PRACTICAL WINDOW INSTALLATION, WIDER CABIN AND FUSELAGE, BY 4 INCHES, & 5 INCHES LONGER. LARGER WINDOWS WHICH WERE RAISED OR LOWERED INDIVIDUALLY, SHATTER-PROOF GLASS IN FRONT OF PILOT. CABIN INTERIOR WAS FINISHED WITH SPECIAL DU PONT FABRIC, WHILE CABIN SEATS WERE SPECIALLY DESIGNED FOR FACILITY OF REMOVAL. LANDING LIGHTS IN WING, WERE ADJUSTABLE BY A SPECIAL WORM DRIVE. TAIL SKID WAS REPLACED BY 14×3 WHEEL.

LOOK FOR THIS TESTORS DOPE D'L

AT YOUR FAVORITE MODEL-HOBB\H

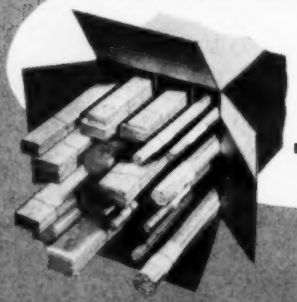
TESTORS

DOPE

For modelers who want the best!

Costs a little more... worth a lot more!

INSIST ON THESE OTHER TESTORS MODEL SUPPLIES, TOO... by name!



TESTORS BRANDED BALSA

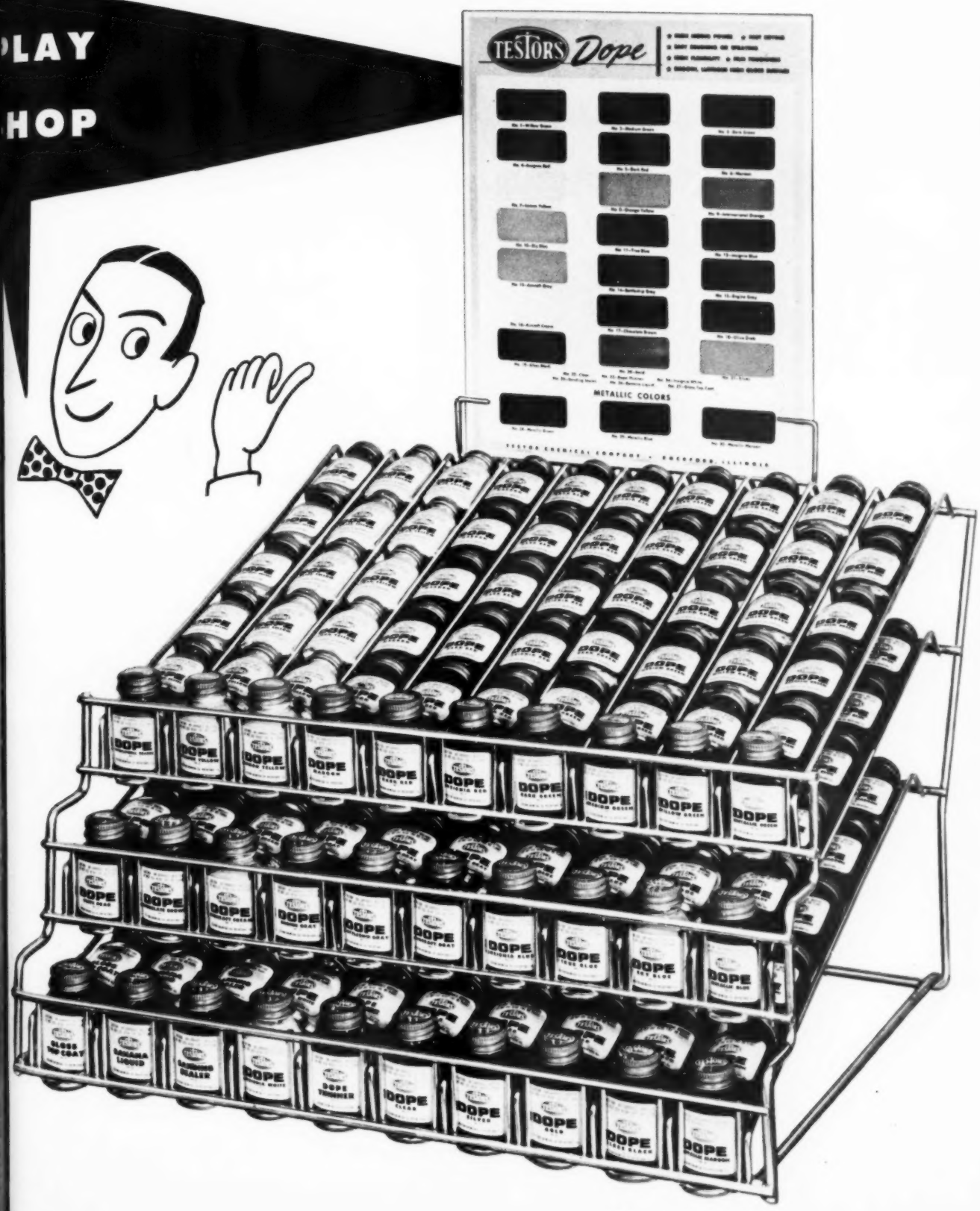
TESTORS "39" MODEL ENGINE FUEL

TESTORS MODEL AIRPLANE CEMENT

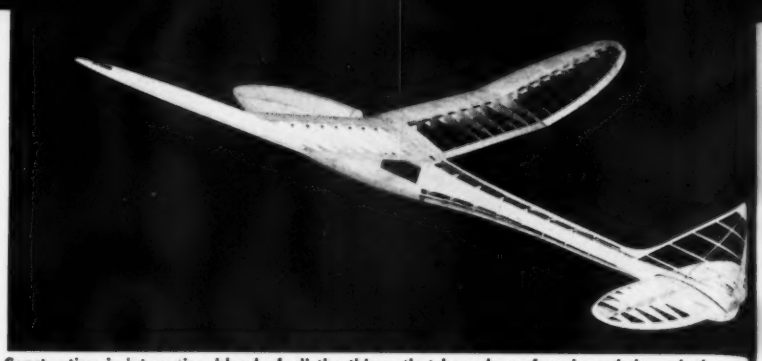
TESTOR CHEMICAL COMPANY, ROCKFORD, ILLINOIS

D'LAY

B\HOP



Stable on the tow, a dream to fly, this high performance sailplane will be a pleasant break between noisy gas jobs and complicated radio airplanes.



Construction is interesting blend of all the things that have been found good through the years. The sheet sides fuselage, with cross pieces and stringers, is easy way to streamline.

★ big time

Shown here readying Big Time for launching, the author is apt to tackle almost any kind of ship when not tinkering with radios. Matter of fact, a compact unit would do.

by BOB MILLER

On the tow, this glider does not weave from side to side. Note launcher standing directly below. Span of the narrow polyhedral wing is 78 in.

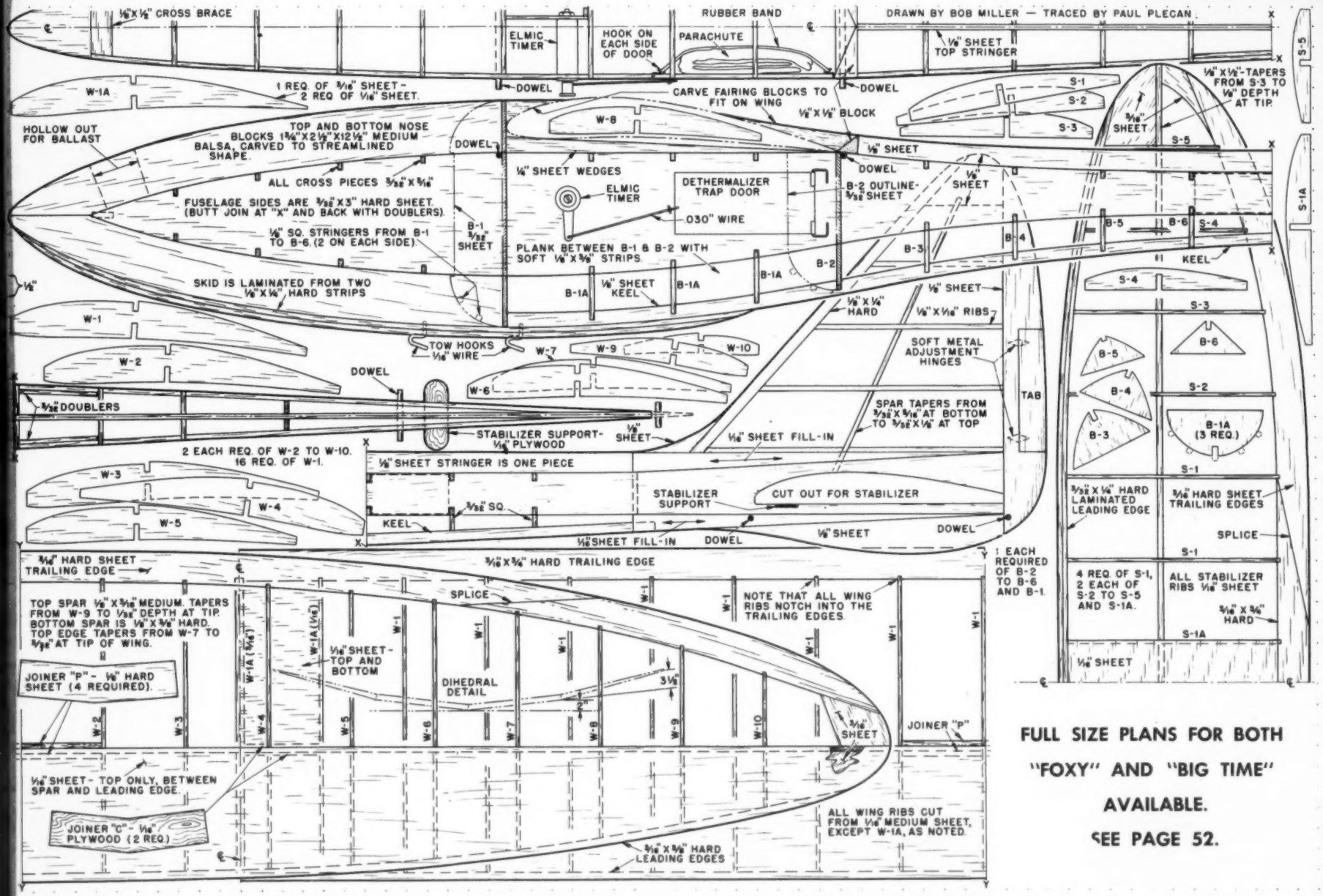
▸ High performance is the usual thing most model builders are seeking when they start a new model of any sort and far too many builders are content to stop right there. It is the author's opinion that model aircraft should not only fly well, but should also be a thing of beauty and grace. It might be said by some that a beautiful model is not necessary. I might mention, too, that many a paper bag has gone out of sight, so you can draw your own conclusions.

For the sake of being different, Big Time sports an elliptical wing and stabilizer plus a well streamlined fuselage. The wing area, being 500 sq. in., makes her an ideal sport job. The finished model, with a paint job, weighs about 15 oz., yet the construction is really rugged. Three ounces of lead in the nose brought her into balance and any additional weight can be carried at the center of gravity. The fact that the model carries 6 or 7 oz. per 100 sq. in. of area should be most enticing to those interested in radio control.

The tow characteristics of this sailplane are excellent and she will respond to left or right with a gentle pull to either side of the nose without the runner having to change his direction of tow. Very helpful is a thin strong line of nylon fishing tackle as it has less sag and air drag than the string or cord commonly used. On a 100-ft. tow line, this model averages at least three minutes per flight under poor flying conditions.

The wing and stabilizer are constructed in the usual manner except for the stab leading edge, which is laminated to reduce strain on the structure. Since the trailing edges are curved and made from several pieces, pre-cement the splices and join carefully. The under camber of the wing will require the spar to be blocked up during construction and the trailing edge will also need slight blocking to maintain the proper airfoil curvature. Be careful when sheeting the wing not to cause the panels to warp; this applies especially to the outer ones.

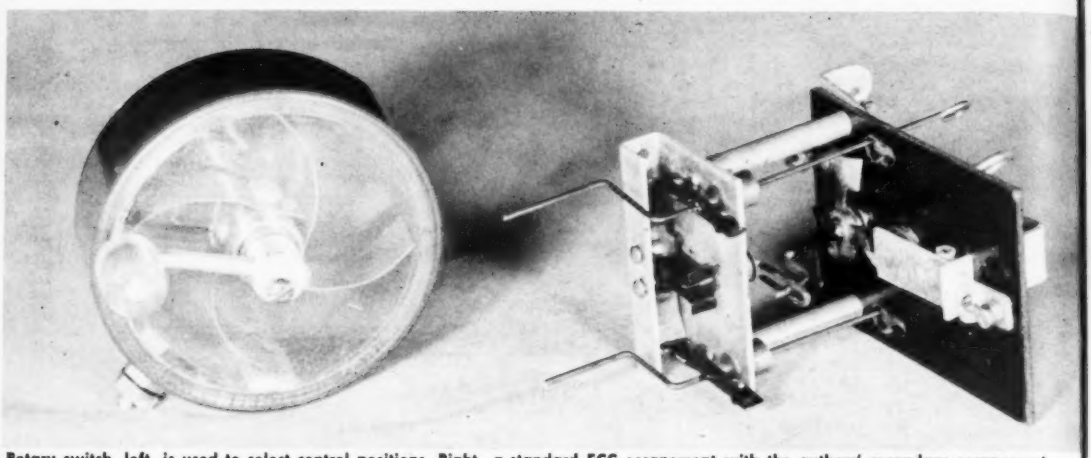
The fuselage side is drawn on 3-in. wide 3/32 sheet balsa which has been spliced at point X with a butt joint. Pin this sheet on top of another *(Continued on Page 43)*



FULL SIZE PLANS FOR BOTH "FOXY" AND "BIG TIME" AVAILABLE.

SEE PAGE 52.

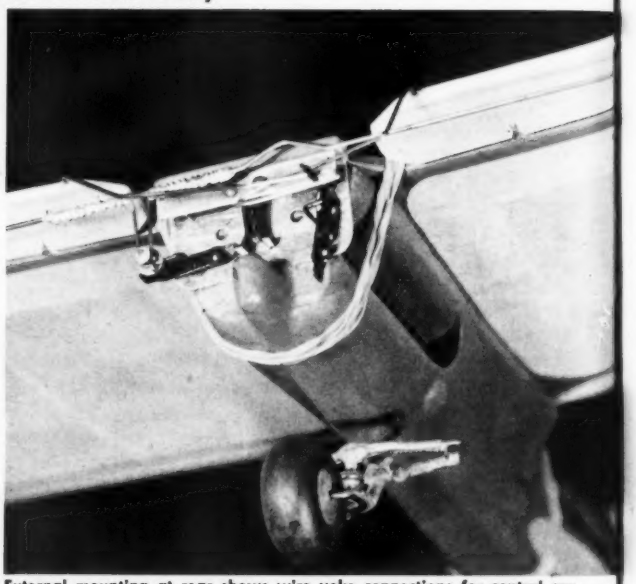
For the RC Fan



Rotary switch, left, is used to select control positions. Right, a standard ECC escapement with the authors' secondary escapement added. One crank moves rudder; the other, elevator. One important advantage is a light rubber motor on main escapement.

by Jim Doherty and Bill Dunwoody

Doherty launches a ship with multiple escapement. Full cycle both controls requires two revolutions of primary escapement; 180 degree neutrals.



External mounting at rear shows wire yoke connections for control surfaces. Turn switch in hand to correspond to control, if sequence is lost.

An inexpensive method of obtaining those extra controls. It's the multiple escapement. You can make it yourself and attach it to any of many standard escapements. Control box is simple, too.

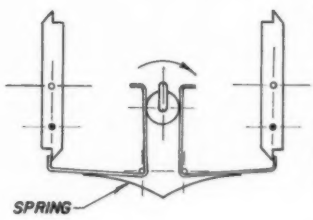
Like most spectators, we were impressed by the performance of radio controlled models having, in addition to rudder control, elevator and/or motor control. Desiring to achieve the same performance in our own models, we were anxious to build and to fly with such equipment. After becoming more familiar with this equipment we realized that increasing the number of controls resulted in a very great increase in complexity of equipment and in the time and effort required to keep it in working order. Naturally, this was accompanied by an increase in cost.

Discouraged by the equipment we were using, we set out to develop a simpler means to the same end. This goal was not as far beyond our reach as we had been led to believe. Once the basic idea was formulated it was merely a matter of testing and development until we had a system far better than had initially been our goal.

This is one of the simplest, lightest and most reliable multiple control systems yet introduced to achieve full control of both rudder and elevator. It provides for the addition of motor control. All operate with a conventional transmitter and receiver.

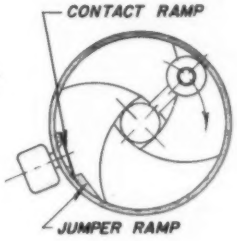
The average modeler, having considerable time and money invested in his present ship and equipment, is naturally reluctant to discard them for the more complex multiple control systems. If his present rig utilizes a two arm escapement, as is true in so many cases, it is only necessary to add the two units shown in order to convert to multiple escapement control. Installation of the units involves nothing more than substitution of the rotary switch, which is the brain of the system, for the present push button on the transmitter, and the hooking up of the secondary escapement to the two-arm escapement already in use.

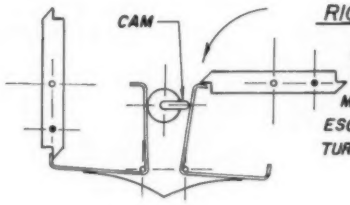
The two-arm escapement (referred to as the primary escapement in this system) provides the initial action in moving the control surfaces, *(Continued on page 46)*



TYPICAL NEUTRAL (STATIONS 1, 3, 5, 7)

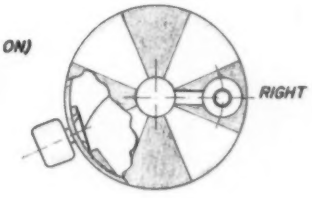
NOTICE THAT NONE OF THE WIPERS ARE TOUCHING THE CONTACT RAMP (SIGNAL OFF) PRIMARY ESCAPEMENT HOLDS CAM IN A VERTICAL POSITION, AWAY FROM ROCKERS. BOTH SECONDARY ESCAPEMENTS ARE IN A NEUTRAL POSITION.

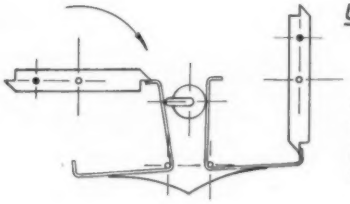




RIGHT RUDDER

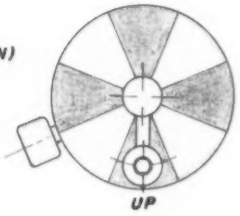
WIPER IS TOUCHING CONTACT STRIP (SIGNAL ON) PRIMARY ESCAPEMENT HAS ROTATED 90° MOVING ROCKER OF RUDDER SECONDARY ESCAPEMENT ALLOWING ITS WHEEL TO TURN 90° WHICH WILL GIVE RIGHT RUDDER.

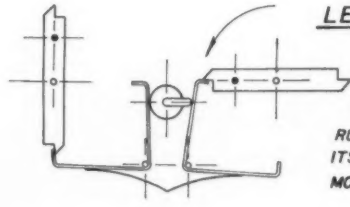




UP ELEVATOR

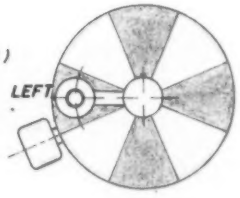
CONTACT IS MADE BY SECOND WIPER (SIGNAL ON) SECOND INDEXING OF PRIMARY ESCAPEMENT MOVES CAM TO POSITION SHOWN. THIS MOVES THE ROCKER OF THE ELEVATOR SECONDARY ESCAPEMENT WHICH ALLOWS UP ELEVATOR TO BE HAD.

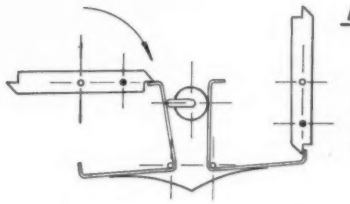




LEFT RUDDER

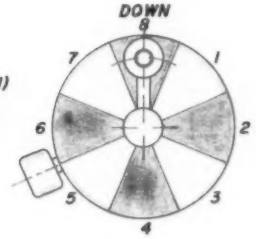
CONTACT IS MADE BY THIRD WIPER (SIGNAL ON) PRIMARY ESCAPEMENT AND CAM BEGIN THEIR SECOND REVOLUTION. CAM MOVES ROCKER OF RUDDER SECONDARY ESCAPEMENT ALLOWING ITS WHEEL TO AGAIN TURN 90° THIS TIME TO MOVE THE RUDDER TO THE LEFT.

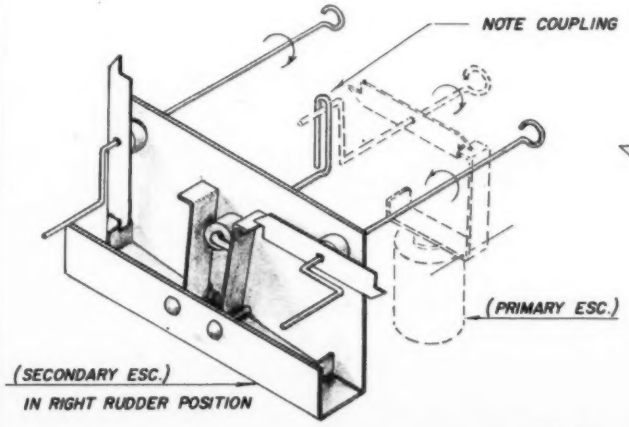


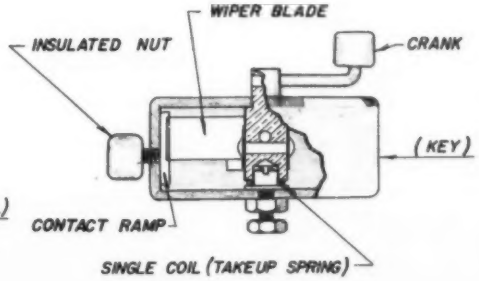


DOWN ELEVATOR

CONTACT IS MADE BY FORTH WIPER (SIGNAL ON) CAM MOVES ROCKER OF ELEVATOR SECONDARY ESCAPEMENT ALLOWING ITS WHEEL TO AGAIN TURN 90° MOVING THE ELEVATOR SURFACE THIS TIME DOWN.







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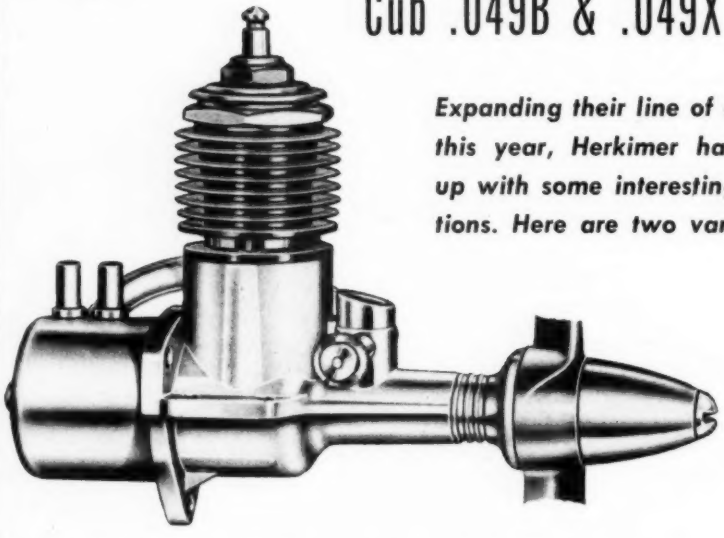
Engine Review

by TED MARTIN

Cub .049B & .049X

Expanding their line of engines this year, Herkimer has come up with some interesting additions. Here are two variations.



▸ Two recent additions to the growing stable of OK Cubs, the .049 Types X and B, are modernized versions of the original and ever popular .049 of .390 in. x .415 in. bore and stroke. They are intended for those who demand the ultimate in Half-A performance, and while internally identical, have different mounting and tankage arrangements for convenience of installation.

The Type X features radial mounting only and is sold in a combination package with a free flight radial tank mounting, a separate back plate for use with other types of fuel tank, fuel tubing, and a 5-1/4 x 4 Kaysun prop.

Type B has a beam and radial mount crankcase of similar design to the original .049 with three radial and four beam bolt holes, their location improved, however, for easier screwdriver access. Tankage is provided by a red anodized pressed aluminum cup, retained by a center tie bolt screwing into the crankcase cover, which is itself screwed into the crankcase, so that its joint gasket is also used to seal the mouth of the tank. Two tubular vents are fitted side by side with an adjacent hole to receive the fuel tube, their location being best suited for free flight.

Further differences on the Type B are a prop driver which is extended by 3/16 in., the replacement of the usual prop washer by a small aluminum spinner, and, of course, a longer prop retaining screw.

With the exception of those parts mentioned above, the two engines use identical components, which is a big point in favor of owning both, and while definitely producers of competition performance, they are also ideal engines for those fun jobs one often takes to the field in case the radio outfit cracks up. Their unfailing performance and reliability, combined with a refusal to wear out, will provide many a good session.

To get to the features which make these engines go, the biggest single improvement over the older design is a much lower bore/stroke ratio, namely .420 x .360 in. respectively, almost a reversal of the original dimensions. This results in lighter reciprocating parts, greater piston crown area, and longer and therefore larger exhaust ports. Base compression is increased by the lower crankcase volume required to accommodate the shorter crankthrow, and the resulting reduction in conrod length makes it correspondingly stronger.

Further improvement stems from a squared crankshaft rotary valve port and air intake, larger crankshaft gas passage, a counterbalanced shaft and slightly wider exhaust ports.

All these modifications, however, are directed toward raising the rpm figure at which peak bhp is produced, and accordingly raising the (*Continued on page* 48)

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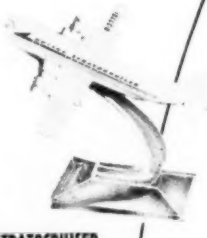

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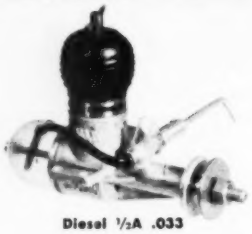

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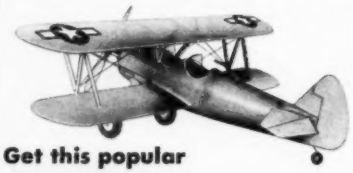

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What Is Performance?

(Continued from page 22)

The first useful product of an engine is *torque*. This is the word referring to the rotational force available at the crankshaft, and is measured in foot/pounds. If it were possible to fasten one end of a foot rule at right angles, horizontally, to the crankshaft of an engine, and balance out the rotational force of the shaft with a 1-lb. weight hanging on the other end of the foot rule, the engine would be producing a torque value of 1 ft./lb. Torque is the force which is actually recorded by a dynamometer, the instrument for measuring engine power, and most other performance values are calculated from it, in conjunction with other known factors and dimensions.

Revolutions per minute (rpm) is simply the number of complete revolutions covered by the crankshaft in one minute.

Brake horsepower (bhp) is the measurement of actual work done by the engine in a specific time, and is the only true horsepower.

One bhp is the amount of work required to lift 33,000 lbs. 1 ft. in one minute, or 1 lb. 33,000 ft. in one minute, against the forces of gravity.

If, for example, our engine producing 1 ft./lb. of torque were doing so at 10,000 rpm, it would be giving a power output of $\frac{6.284 \times T \times N}{33{,}000}$ where T is torque in foot/pounds and N is rpm. This would be 6.284 x 1 x 10,000 divided by 33,000, which is 1.9 bhp.

If you are one of those who instinctively bypasses anything remotely connected with mathematics, perhaps you will forgive the suggestion that you have another look at that formula. It is very simple and worth knowing as it applies to all piston engines.

Brake horsepower, or actual power output, is not the only quantity required in order to determine the merits of an engine. A 2,000 bhp locomotive is ideal for the railroad, but owing to sheer size and weight, would be useless for an airplane. Conversely, a 2,000 bhp airplane engine would be unsuitable for the railroad. The difference between them is that the former produces tremendous torque at very low rpm, whereas the latter has relatively little torque but operates at high rpm. The work each does in a given time (bhp) is, however, the same. A model two-cycle airplane engine produces less than half as much torque in proportion to its big brother, but operates at five or six times the rpm and often is as much as twice as powerful for its size.

In short, it is essential to know at what rpm the maximum bhp is produced, and it may generally be taken that high power at low revs indicates a strong puller for low speed applications; and high power at high revs, a moderate to poor puller, but at its best driving a light load at high speeds.

Since a piston engine will produce power, within its operating range, roughly in quantitative proportion to the amount of fuel it consumes in a given time, it is obvious that a low revving engine will have to have large cylinders to produce the same power as an engine with the same number of small cylinders running at high revs. A familiar example is the big Anderson Spitfire which puts out .75 bhp at 10,000 rpm, whereas the Dooling .29, of half the size, gives the same power at 17,000 rpm. They both consume a similar quantity of fuel in a given time. The former gets high torque from its big cylinder, which, being big, is heavy, whereas the Dooling has half the torque, but makes up for it with high rpm, and also less than half as much as the Spitfire.

Therefore, the bhp output per pound of engine weight of the Spitfire is low compared with the Dooling. Similarly, the bhp per cubic centimeter of piston displacement is half that of the Dooling. In engine parlance, the Spitfire therefore has a low power/weight ratio, measured in bhp/pounds, and a low power/displacement ratio, measured in bhp/liter.

All this would appear to condemn the Spitfire as an inefficient engine, whereas it is actually outstanding at its particular job of putting out high torque at low revs for driving large props and lugging slow, heavy models. The Dooling would be useless under similar conditions because it would be unable to attain the necessary rpm to develop full power.

The question which will immediately spring to mind is: "How much power will the Spitfire produce at 17,000 rpm?" In the first place, it is not designed to run efficiently at that speed, but a similar sized engine, the Dooling 61, is, and as a result does in fact turn out twice the bhp of its small brother at the same speed.

The factor limiting the Spitfire to low revs, more than anything else, is its volumetric efficiency. This means its ability to breathe or inhale a cylinder full of mixture on every stroke at high speeds. Gas passage and port design, timing, and bore/stroke ratio govern the speeds at which an engine breathes efficiently, and unfortunately the ideal set-up for high peaking speed is totally incapable of producing good low speed, high torque performance and vice versa. Therefore, although the Spitfire cannot breathe properly at very high speed and therefore has low volumetric efficiency, it is not necessarily an inefficient engine. It is simply de-

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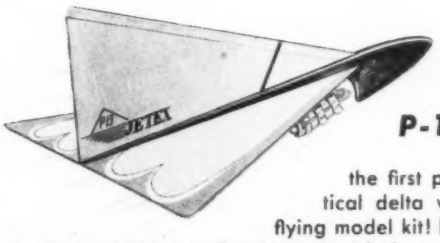

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It is difficult to measure volumetric efficiency, and as it is a cause rather than an effect, there is no general need to do so. However, an indication of where, in the rpm range, the peak volumetric efficiency lies, may be deduced from the calculated factor known as *brake mean effective pressure* (bmep). This is simply a figure derived from the known performance and dimensions of an engine, to denote over-all engine efficiency and to permit comparison with other entirely different types. The figure denotes the average pressure acting on the piston in pounds/square inches as measured at the crankshaft, which means that all the internal losses in the engine, taking place during the transmission of this pressure to the shaft, have been taken into account.

Since there is inevitably a limit to the speed at which an engine can breathe and since, in a well designed engine, breathing, or volumetric efficiency, is the factor which controls rpm at which maximum bhp is produced, it will be obvious that when volumetric efficiency falls, there will be a corresponding fall in combustion pressure acting on the piston, and therefore bmep will indicate the rpm at which this occurs. It does not follow, however, that bhp will also begin to fall at the same rpm. Volumetric efficiency is only reduced gradually with increased speed, and as we have seen, bhp is derived from torque and rpm. Reduced volumetric efficiency results in reduced torque and bmep, which is calculated from torque, but the revs will continue to increase, with consequently increased bhp, until a point is reached where the fall in torque valve offsets the over-all effect of increasing rpm, thus causing a decline in bhp. From this point upward on the rpm scale, the engine is using an increasing amount of its power simply to maintain speed, and has therefore passed the peak of its power output curve.

For two-cycle engines, bmep in lb./sq.in. $\frac{T \times 75.4}{\text{displacement}}$ where T is torque in foot/pounds and the displacement of the engine's piston is in cubic inches. From this it is evindent the bmep varies with torque, and that the engine having high volumetric efficiency will have high bmep at high rpm, and the volumetrically inefficient engine, high bmep only at low rpm, the former type giving the highest bhp.

Therefore, to assess correctly the efficiency and merit of an engine, the things to consider are peak bmep and the rpm at which reached, the power/weight ratio in bhp per pound and, finally, bhp itself. In other words, bhp as advertised by the automotive industry has very little meaning as it does not indicate how much engine is required to produce it. Broadly speaking, an engine intended for hauling a heavy radio model should produce unusually high bmep at low rpm, and an engine for racing should give its peak bmep as high up the rpm scale as possible, and to achieve maximum bhp the decline in bmep with increasing speed should be gradual rather than abrupt.

The object of modifying and tuning an engine for speed is to raise the peak bmep value by making it occur at higher rpm, thus enabling the production of more bhp at higher rpm. Apart from mechanical refinements and reduction of mechanical friction, this is achieved mainly by improving volumetric efficiency.

We hope to describe in later articles some engine modifications that increase performance, and while the foregoing definitions may seem rather tedious, an understanding of these terms will save a lot of theoretical explanation when describing the reasons for, and the advantages of, the essentially practical engine alterations to be discussed.

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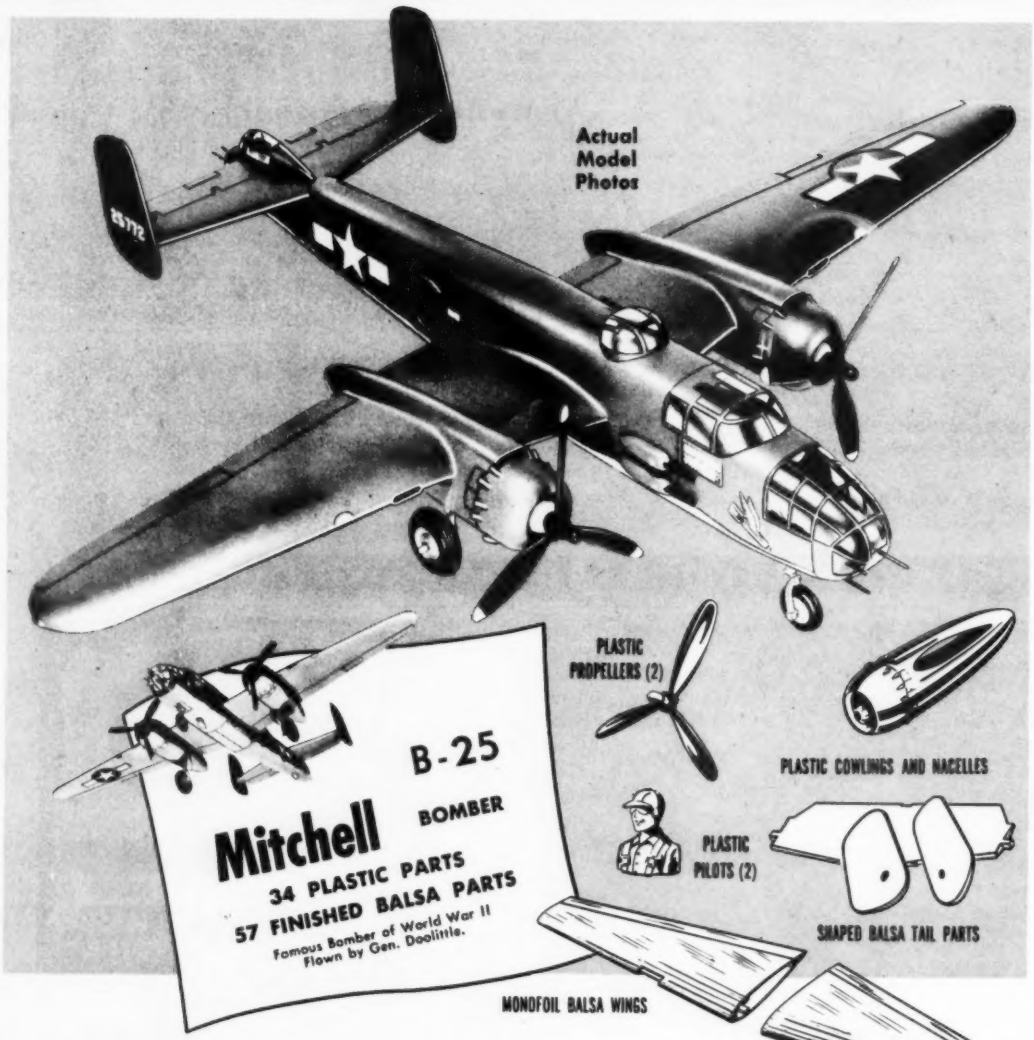

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Radio Control News

(Continued from page 5)

builder is the radio receiver and relay. Inasmuch as there are numerous types of receivers on the market, it would be impossible to go into the peculiarities of each set. However, we will attempt to point out the principal things to look for in order to obtain good performance.

At the present time there are two basic types of receiver, each with its own merits: the gas tube and the hard tube. Each of these in turn is broken down into several types: i.e., the single and dual gas tube receivers for straight carrier operation and the single hard tube receiver plus the multi-tube audio modulation type receiver.

The manufacturer or designer's instructions should be followed explicitly for proper operating procedure. As in the case of general hook-up wiring, be sure to use stranded wire and rosin core solder in making connections. If erratic operation is evident, check all connections for continuity. Wiggle each component slightly with your finger to make sure its solder connections are all right. A bad solder joint sometimes needs the vibration and jarring of flying and handling to show up. Check filament and B-plus circuits for continuity, with the proper range milliammeter in series, to make sure the tube is receiving the correct power. If a faulty tube is suspected the only thing to do is change the tube.

One of the so-called problems on any radio receiver is to keep the relay in good condition. Since there are various types of relays, each particular type should be adjusted to the manufacturer's specifications. There are, however, several things that can be done to make their operation more reliable. First of all make sure the contact surfaces are clean and free of dirt or grime. This can be done by running a piece of crocus cloth or even ordinary newspaper between the points. *Do not* use a file or coarse sandpaper on the contacts as this roughens them and increases pitting and burning conditions. Secondly, the use of a spark suppressor is recommended on all relay contacts. This helps prevent the inductive arc, imposed on the contacts by the actuator coil when the circuit opens, from burning and pitting the contacts. Fig. Y shows the hook-up and the values given will suffice for most actuators and escapements. *Never* oil the moving parts of a relay, since oil tends to collect dirt and also becomes gummy.

When mounting the receiver and relay, suspend by rubber bands or encase in sponge or foam rubber. The latter method is becoming increasingly popular. If rubber bands are used, make certain they have enough tension to prevent the receiver from being too loosely suspended. If it is too loosely suspended, a hard shock will allow the receiver to hit a structural member, thus obviating the use of a shock mount. If sponge or foam rubber (obtainable from your local 5 & 10¢ store in the form of sponges) is used, allow about 1/2 to 1 in. on all sides and be sure the relay does not touch the rubber, thus possibly preventing it from working.

One of the questions that came up at the Nationals, regarding both gas and hard tube receivers (carrier type), was the loss of range in the air when ground checks proved okay. This was proved to be caused by several factors. First, the polarization of receiver and transmitter antennas should be the same. This means that if a vertical antenna is used on the transmitter, a vertical antenna should be used on the plane. Many flyers will argue that this is not necessary for good control. This is true *only if* the receiver and transmitter are perfectly tuned. However, if the receiver and transmitter are slightly mistuned, using vertical and horizontal antennas, insensitivity will show up much more at extended ranges. Polarized antennas therefore help to correct this condition.

Secondly, the wiring of individual hook-ups varies enough to cause dissimilar operating conditions even when using the same types of equipment. In this case, body capacity enters the picture and often there is no control 25 ft. in the air after ground checks have given excellent results. The flier usually tunes his plane at 200 or 300 ft. from the transmitter while holding it in his hand and with his tuning meter in place. The range check indicates perfect control at the time but loss of control in the air. A brief explanation of this is that the flier's body capacity, when holding the plane during tuning procedure, enters into the capacity needed to tune the tank circuit. Usually, his hand is near a lot of superfluous wiring. This capacity disappears when the model leaves the hand of the flier. There are several ways to help correct this difficulty, which seems to occur with practically any type of receiver under certain conditions.

1. Use polarized antennas; that is, both receiver and transmitter antennas either vertical or horizontal.

2. Keep wiring in your installation *neat* and away from hand gripping spots.

3. If difficulties persist, try placing your plane on a support (a cardboard or wooden box) about 2 or 3 ft. off the ground at a distance of 200 or 300 ft. from the transmitter when tuning. After a preliminary tuning, step back a few feet and again note the operation. A slight retune may be needed. A final check at the same spot should be made with the tuning meter removed. Perfect response should still be had.

4. A final scheme is to employ a trailing wire, cut to the same length (a minimum of about 24 in.) as the antenna, and soldered to the B-minus connection on the receiver. This provides a form of ground plane for the antenna, thus increasing the efficiency.

Next month we'll cover the transmitter and

(Continued on page 42)

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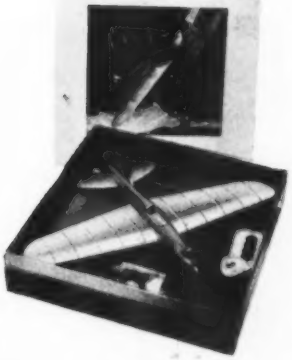

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NEW ITEMS

Wilson's of Cleveland, Ohio, is announcing its new improved motor and gear train. Quite a speed range can be had with this unit, and it is especially recommended for RC boats and cars. One of their metal cased motors with a built in speed reducer unit is shown in photo. All motors operate on 1-1/2 to 6 volts and with very little battery drain. Obtainable from your local hobby dealer.

It is reported that the Citizen-Ship Radio Corp. will soon have on the market a new escapement which will sell for around $5.95. We know it will rank along side the famous Citizen-Ship 27 and 465 mc radio units as an item of reliability. Available, when ready, through your local dealer.

The Dover Electronics, Inc., of 201 E. Blackwell St., Dover, N. J., is one of the latest companies to come into the RC field. This company is currently announcing a receiver, transmitter, escapement, a pulsing unit, a direction or interference finder, a bench power supply and a combination multi-meter/field-strength meter. The receiver features a 3S4 tube and a Sigma 4F relay and sells both as a ready built unit and in kit form. The transmitter may be hand-held or placed on the ground and is also available ready built and in kit form. The pulse unit is said to operate any self-neutralizing escapement and eliminates the necessity of sequence remembering. The escapement is of the self neutralizing type. The direction finder should be a good "club" unit and may be used in locating sources of interference on 27 mc, as well as for probing the woods and tall grass for a downed plane.

Mr. Frank Adams of Janesville, Wis., is marketing a pulse actuator which is one of the best we have seen to date. Mr. Adams came in fifth at the Nationals using this unit in a small Class A ship. Even in the wind, excellent control was maintained. Price is about $6.95. This lightweight unit has very low current drain on a 3 volt supply and is suitable for any receiver/transmitter combination in use today. Instructions are given for a simple ground control box which will give conventional left/right control or proportional control.

Control Research notifies to stand by for a new receiver in kit form. Reports show this to be a lightweight, low current drain twin tube set.

On July 1, the name of Vernon C. Macnabb Co. was changed to Citizen-Ship Radio Corp. This represents a change in name and corporation only; the same manufacturer will continue to produce the familiar Citizen-Ship equipment.

It has been quite some time before we have had anything new in the battery line. The newest arrival on the scene is a 45 volt battery by RCA. The battery is unique in that it is the first miniature 45 volt battery to make its appearance in almost 15 years. It measures 17/32 x 1 x 3-1/2 in. over-all and weighs about 3 oz. New type of construction makes excellent life possible. The best feature by far is the miniature snap connection. This eliminates the problems of battery boxes and of soldering wires to the standard 22-1/2 volt units now in use. Price is only a few pennies more than two 22-1/2 volt batteries.

FLASH! As this goes to press we learned of a new actuator. It is being distributed by Polk's Model Craft Hobbies of New York City. This unit, in a plastic housing, measures 1-3/4 x 1-7/8 x 2-9/16 in. and weighs 3-1/2 oz. With this Servo you have double control on a single channel including the features of true proportional control and *simultaneous* operation of *both* controls. It can be used on any receiver and is by far the most amazing item of this kind we have seen in a long time. Leave it to our English cousins

to come up with unique item like this. The price will be around $10.00.

CLUB NEWS

Bill Newbitt of the Washington DC/RC Club writes to notify of a club membership of 50 RC boys. The main feature of this club, which should be followed by other RC'ers around the country if possible, is an electronics and radio course. This course includes the showing of films on radio and electricity, supplied by the CAA, Navy and Office of Information on diodes, triodes, impedence and antenna radiation. This is what we call really going in for RC.

The radio control gang in Minneapolis, known as the Minneapolis Hot Watts, is another club of about 50 active members. "Red" Costlow reports that the most popular size ship is powered with approximately a .15 engine, with the .29's running second. A nice thing about this club is that they have a mobile or portable transmitter ready to give chase—just in case.

July 12, the Lexington Exchange Club sponsored the Kentucky State Contest. First place was won by Art Morgan, who we understand may have used a transistor receiver. His ship was the reliable Rudderbug with proportional rudder control. Operation was on 50-54 mc. Second place went to Charles Ross and third place to Claude Curry of Louisville, flying an original design with the Citizen-Ship 465 mc radio. Approaching the Air Races theme was an event flown around and through markers placed 200 ft. apart. Needless to say this event was popular with contestant and spectator alike. Reporting was done by the RC director, Jim Marvin.

Big Time

(Continued from page 30)

which has been spliced in the same manner. Cut and notch both sheets simultaneously. Cement the balsa doublers on the inside of each fuselage side at the splice. With the sides upside down on the bench, cement bulkheads B1 and B2 in place. When they are dry, the ends of the fuselage can be joined and the nose pulled in and cemented at its proper width. The 3/16 x 3/32 spacers can be cemented in place at this time, while maintaining the width indicated on the plans.

The nose top and bottom is carved from medium balsa block. Spot cement to fuselage and rough carve to shape, remove and hollow out to about 3/16 to 1/4 in. thick. Do not carve too thin as the nose will need lead ballast anyway. Cement in place and finish the outside. Add the formers on the bottom and then the keel. The two bottom stringers on each side of the keel between B1 and B6 should be evenly spaced and are laid down as the planking progresses between B1 and B2. The rear half of the stringers are left free until the planking is finished and then they are cemented in place. The top stringer is one piece to the end of the fuselage and should be rock hard balsa.

The rudder and sub-rudder are cemented to the fuselage. The plywood stab support is added after the 1/16 sheet fill-in is completed on top and bottom of fuselage end. Sand the entire fuselage at this time, dope and resand. Silk is recommended for the fuselage as it will strengthen the wood and prevent splitting. Cover the fuselage and apply three coats of clear dope. The skid is made from two 1/8 x 1/4 balsa strips. The first one may be medium hard balsa. Cement it to the bottom of the nose and wait until it is completely dry before the rock hard outer one is laminated to it.

Dope and sand the wing and stab. Cover with silk or heavy Silkspan paper and apply three coats of clear dope. The parachute dethermalizer door is fitted after painting the model. One or two coats of colored dope may be applied, depending on the coverage.

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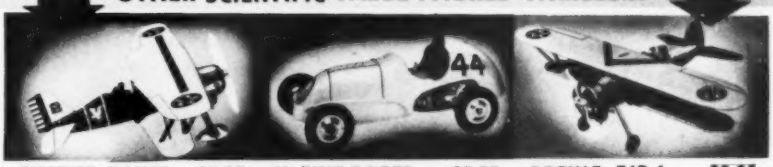

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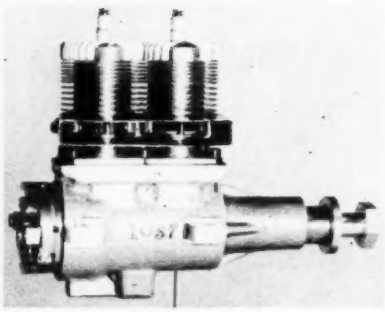

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The last step is the adding of hardware. Fit the door to the fuselage with music wire and aluminum tubing hinges. An Elmic timer was used on this model, but a fuse type fitting could be used. Three tow hooks were mounted on the original model, but only the rear two were ever used. Although trimmed for a fairly tight turn, this model did not require side tow hooks and it is left to the choice of the builder to mount them. A small music wire eye is cemented to the bottom edge of the sub-rudder for the chute cord. A 12-in. square chute will be large enough.

Assemble the model and add lead to the nose until the model balances level when held 3/4 in. behind the wing spar. The glide should be fairly fast and flat. Incidence of the wing should be maintained as indicated on the plans and trim should be achieved by adding lead shot to the nose. When a good straight glide is obtained, the circle can be introduced by degrees while trimming for a flat glide. If the model tends to circle one way better than the other, use that circle rather than force the turn. The rear hook will be required for calm days and the front hook takes care of windy weather. Tie a streamer of cloth on the tow line about a foot or two in front of the tow ring, hook up and let her go.

foxy . . .

(*Continued from page* 14)

or moving the elevator. Sharpness of turn is then achieved best by shortening the nose moment and lengthening the tail moment using a constant CG. While moving the CG rearward produces quicker response to control, it also causes unstable flight.

To achieve perfect turning qualities, it seems only natural that you should do so with a constant CG and the juggling of moment arms. Practical experience will tell you just how much. I haven't yet found an accurate method of determining this by mathematics, since there is such an enormous change of direction with stunt models that your figures vary too much to give accuracy.

Having flown combat no more than 15 times, I can set myself up as no combat flyer. However, I do know that Foxy has excellent qualities for both a stunt trainer or combat model. Construction is very simple and fast. The plans are very clear. With the wing balanced in the center, add weight to the outer tip until it drops without hesitation, but does not fall very fast.

The fuselage is of 1/2 in. medium hard sheet 4 in. wide. Cement and clamp the 1/16 in. plywood sheet after cutting to shape and allow to dry.

With the tail surfaces cut and sanded from 1/8 in. straight grain medium sheet, add the hinges and control horn and cement to fuselage. The wing is now cemented in place and the removed portion replaced. Carefully install the controls; they make the difference between a good and bad flyer.

Sand the entire model well and apply a coat of clear dope. Sand again lightly. I covered the models with Jap tissue as it is very light and strong. Cover dry and sprinkle with water. Three or four coats of clear dope are sufficient. Add one or two coats of colored dope and the model is complete. If you do not use hot fuelproof dope such as Aero Gloss, Sta, etc., apply a thin coat of fuelproofer, i.e., Tuff, Seal Sure, etc., adding a heavy coat to the motor mount area.

The tank is cut and soldered from .010 shim stock. Use 1/8 in. large ID tubing. An important point is to turn both vents directly into the wind. This gives constant pressure for a smooth motor run.

With 60 ft. of .014 Foxy should hit speeds between 75 and 85 mph. On second thought better make two: you have two flights, you know.

Seven Years with Civy Boy

(Continued from page 17)

order to balance on the trailing edge as did the former models, a long portion (3 in.) had to be added onto the front of the fuselage. This increased the nose moment of the 1948 models considerably.

The 1948 models differed from the 1947 ones only by adding the long nose as a physical lever in order to balance the model as before. These Civy Boys with the long-nose moments were flown throughout 1948 and 1949. This fleet of CB's performed well enough, but we noticed that something in power-on performance was lacking in these long-nosed models. The recovery from climb, after the engine cut, or the transition from power to glide trim, was not as good as the shorter nosed spark ignition models.

By 1950, it seemed that the long nose on the model could be the reason why the casualty rate with Civy Boys had gone up. More vertical fin area had been added to the design by the end of 1949. This added fin area did help some; to what degree cannot be proven. It was found that the longer the nose on the Civy Boy, the more downthrust was required to reduce looping effect under power.

During 1950 the long-nosed Civy Boys were possibly flying as well as any other glow engine models, but still were not flying with the power or consistency of the early original models. It was during this same year at the Dallas Nationals, that it became virtually imperative to pin all the faults in this design on the long nose. However, you could watch other modelers fly and you could see that they had as long, or in some cases, longer-nose moments on their models. To the casual observer, these modelers seemed to get away with it. Closer study showed that the ships that were the most consistent under power were the models that had the shortest of the long-nose moments.

With more critical observation, you could also see that the fellows who were flying the long-nose moments (possibly not by their choice, but a physical model weight versus power plant weight problem), didn't get away crack-up-free either. By looking closely, you could see that they needed a shovel fairly often to dig their torpedoes out of the dirt, too. Or, at times, a broom to sweep the pieces off a concrete runway.

At the end of the 1950 Nationals, out came the saw and off went the long-nose moments (1-1/2 in. of forward fuselage) of the 1950 fleet of Civy Boys that made the trip homeward from the Dallas free-for-all. To make these sawed-off short-nosed models balance, serro bend (low melting temperature metal) was used on rear of firewall for ballast. True, these models with the ballast were overweight, but they were more consistent under flight checks and turned in better average times.

To get away from carrying a useless load of ballast in order to retain the same CG location, and to keep the short nose moment, the tail moment arm of the 1951 Civy Boy was shortened 3 in. or eight per cent. This new Civy Boy balanced at the wing TE with no ballast and no special effort was made to build a light stabilizer. These 1951 Civy Boys performed beautifully at the Dallas National Meet, where only a year before, unless you were flying a moderately powered Civy, it would have been best to crawl under the nearest car after launching one.

This short-nose momented, moderately tail momented Civy Boy was performing with the best, getting as high under power as most hot models and gliding better than most. After four years of only partial success, the new Civy seemed to be back in the groove for contest flying as its predecessors of the

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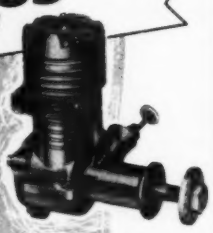
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1946-47 spark ignition era. Sub-fin was added to the later 1951 models. Even though model performance seems basically the same, with or without this, the sub fin has remained on all the later Civy Boys.

The 1952 Civy Boy was the same as the 1951 version.

This is perhaps the right time to express my personal thanks to the fine modeler friends who, by their helpful criticism, energy, and belief, have aided the Civy Boy project. Here they are, and they have helped plenty: Carl Goldberg, Reagan Howell, Bill Krecek, Dick Everett, Bill Winter, Denny Davis, Jim Maston, Myron Garday, Bob James, Raymond Matthews, and Hi Johnson. There are more who can be added to this list, especially the courageous modelers who have built a Civy Boy of some sort.

It would be reasonable to think that after seven years with the Civy Boy one would have had enough Civys to last.

'Tisn't so. There is a new 1953 Civy Boy to follow this article. It follows as a second part entitled "Super Civy Boy 61." Don't let the "super" part seem presumptuous, but it does perform interestingly with some new dynamic and construction features. It is a grand compromise for a "middle of the road" model, yet retains a lion's share of the optimum performance we need to handle our hot engines.

For the RC Fan

(Continued from page 32)

but because it does no more than mechanically move the rocker (pawl) of the secondary, it is not subjected to the heavy loads encountered in moving the surfaces directly. It is therefore possible, and highly advisable, to use light rubber to operate the primary escapement, thus permitting the use of a light, low drain escapement and small light batteries with the chance of skipping reduced virtually to nothing.

By using a mechanical linkage between the controlling primary escapement and the "work horse" secondary, a mechanical advantage is developed which heightens the reliability of this system above that of the single control escapement.

The primary escapement is coupled to the cam which is just a 90° bend in the music wire shaft. As the cam is revolved it alternately raises and lowers the rockers of each secondary escapement, allowing each of the escapement wheels to revolve in turn. It should be noted that a neutral position is obtained once in 180° of rotation of the primary in which the cam raises neither of the rockers. In order to obtain a full cycle of control in both the rudder and the elevator secondaries, it is necessary that the primary escapement revolve through two complete cycles.

Since the cam shaft is mounted in the secondary escapement, the linkage between it and the primary escapement shaft should be free so that any misalinement between them will not cause any additional load on the primary. The linkage shown has proved successful in compensating for any misalinement.

In order to follow the sequence the rotary selector switch shown was developed. It has demonstrated its ability to be completely foolproof and reliable. No other switch, to our knowledge, has been made to do this particular job as well at such a low cost.

To select a control position, the operator has only to rotate the knob to the segment of the switch case corresponding to that particular control. The escapement acts so quickly that virtually no reaction can be detected in the flight as the controls are momentarily deflected in passing through them to reach a desired position beyond. It is almost impossible for the operator to turn the switch so quickly that the escapement falls behind in the sequence. In tests the switch was rotated at speeds as high as four revolutions per

(Continued on page 48)

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Burbank, California

SPAN	54 in.
WEIGHT	28 oz.
AREA	550 in.
ENGINE SIZES	.29. 35 cu. in

$6.95

COUGAR

New aerodynamicaly, new constructively and designed to give the modeler superior performance under all conditions. The photograph, seen above, will readily show you that this plane is absolutely the newest design on the market. Super Airfoils - The HJ04512, at the root tapering down to HJ04006 at the tip. Profile drag and weight are held to a minimum. For a decided thrill, to challenge your ability, try the KENHI COUGAR.

PANTHER	
SPAN	48 in.
WEIGHT	26 oz.
AREA	500 in.
ENGINE SIZES	.29.35 cu. in.

$6.95

Designed by HI JOHNSON

PANTHER

A definite challenge to the ability of any stunt flyer, yet as stable as can be. A combination seldom found in a stunt plane. Like its namesake the PANTHER is a smooth, but highly reactive ship. Spectacular flying is at its best when you fly the KENHI PANTHER. The PANTHER is of new futuristic design, and embodies many new features not found in the run-of-the-mill models. The canopy is a new type and does not require tedious trimming. You will be the envy of your friends when you fly the PANTHER.

BOBCAT	
SPAN	37 in.
WEIGHT	19 oz.
AREA	324 in.
ENGINE SIZES	.19 .35 cu. in.

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WILDCAT	
SPAN	37 in.
WEIGHT	20 oz.
AREA	330 in.
ENGINE SIZES	.19.35 cu. in

$4.45

WILDCAT

Every effort has been made to develop the utmost in simplicity of construction, lightness of weight and greatness of performance in the NEW WILDCAT. Designed around the famous HJ03515 air foil plus the best basic stunt features possible, it has new low drag wing tips, profile drag cut to a minimum, low wing loading (.06 oz. per sq. in.). The WILDCAT is the plane you have been waiting for.

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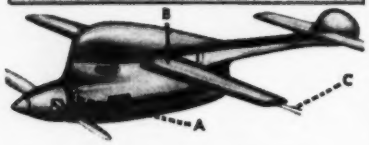

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FOR RC FANS

Just what you have been waiting for! Full-size (35" x 45") plans of two more popular radio control models.

ACROBAT: An amazing two-control rudder and elevator-machine for the Cub 14. Performs consecutive loops, power dives, true stalls, and has flown inverted. Also good on rudder alone and flies well in the wind. Span is 54 inches.

"CQ": E. J. Brown's beautiful ship for .19's, published in the June 1952 issue. Simple to build and tremendously maneuverable. Features crutch fuselage construction and sliced wing rib strips for rapid building.

Both plans 50c p.p. via 3rd class mail. (For 1st class mail add 10c and for air-mail 20c).

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551 Fifth Ave., New York 17, N. Y.

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second with no skip or lag. The normal speed at which the switch would be operated is so far below this that no trouble should ever result from this source.

Again, as the photographs and sketches show details so clearly, only a brief description will be given here. The four spring brass wipers are mounted to the shaft so as to allow rotation only in a clockwise direction. Mounted on the inside wall of the case, adjacent to each other, are two raised ramps, one of insulated material and the other of brass. As the crank is rotated, one wiper rides up the insulated "jumper" ramp and falls onto the brass contact strip. Thus the circuit is made. In such a manner it is impossible for the signal to stutter before positive contact is made. Further rotation of the crank causes the wiper to drop off the contact strip breaking the circuit, again with no chance of stuttering. Each of the four wipers performs this operation once during each revolution of the switch. The ramps are spaced so that one revolution is divided into eight equal segments, four "on" positions separated by four "off" positions.

No sequence correcting jumper switch is needed, for when the knob is placed in a control position and the reaction observed, it is merely necessary to turn the whole switch around in the hand until it corresponds to the control in effect. Painted on the face of our switch we have a design similar to a Maltese Cross to give visual differentiation between the control positions and the neutrals. The sensation of the snapping wipers so clearly defines the positions that the painted design is really needed only to position the switch in the hand to start with. This particular switch proved reliable and is so simple and inexpensive that we prefer it over the more complex joy sticks and deep boxes.

An additional feature worth stressing is that one or more of the four neutral positions may be utilized to activate a motor control or cut off. Wiper brushes on either the primary or secondary escapements seem to be the least complicated and most dependable means of determining the motor position. The actual means of executing the control action are far too numerous to be covered at this writing, but most of the popular systems now in use can be adapted with little trouble.

The beauty of this multiple escapement is that while it gives such a tremendous increase in the control a flier may exert over his plane, it requires very little "extra" in the way of technical skill and equipment.

Engine Review

(*Continued from page* 34)

bhp itself. It is probable, therefore, that the low speed torque is slightly lower than that of the older design, as this invariably suffers as a result of features which increase rpm. The original .049 will have advantages where big prop performance may be desired for certain scale free flight requirements.

General construction follows the time tested Cub pattern with a pressure die cast aluminum alloy crankcase with integral intake and unbushed main bearing, and pressed in spraybar.

The female thread for cylinder retention is split at either side by two milled by-pass passages which lead up to the patented Brebeck cylinder porting, details of which may be found in Cub .14 test (MAN, Jan., 1953).

Crankshaft end thrust is handled by machining the crankcase thrust face to leave a slight annular projection to bear on the crankdisc. Surface finish of the bearing bore is excellent.

The air intake has a circular entry which gradually blends into a rectangle around

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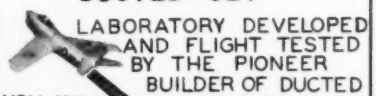

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the spraybar and maintains this section into the bearing, thus providing a highly efficient valve which permits the largest possible opening area with the available shaft diameter. Placement of the spraybar is such that the two jet holes point at right angles to the airstream. This arrangement is common to all the Cubs and has been noted on several other recent designs, presumably for ease of manufacture.

A neat detail on all Cubs is the use of soft copper gaskets at the cylinder/crankcase joint. There is less tendency for vibration and expansion to loosen the joint, and less variation in port timing with different degrees of tightness, and they are virtually blow-out proof.

The blued steel cylinder is machined all over with integral cooling fins, and three milled exhaust ports interposed by raked circular by-pass ports. Bore finish is excellent and tapers slightly from below the port bolt to reduce piston drag. A female thread at the top receives the aluminum cylinder head with two or three thin copper gaskets at the joint. A good point for those interested in tuning.

An unusual feature of this head is that, although a short reach plug comes with the engine, there is sufficient length of thread to accommodate a long reach type, so that the former is slightly shielded.

Crankshaft appearance is very neat, the squared valve port looking particularly potent, because of the greatly increased area compared with a round port of similar width. Shaft diameter is 7/32 in., with an 1/8 in. crankpin and 5/32 in. dia. gas passage. Counterbalancing is accomplished with a crescent type projection, thus preserving a full circular crankweb. Prop driver location features heavy knurled splines and internal threads for the prop retaining screw.

The case-hardened steel piston is light and strong with a well fitted solid wrist pin, and is particularly notable for its excellent ground finish and accuracy. The skirt is full fitting in the sense that it is not relieved in any way and contributes greatly to the durability of the engine.

Unusually long bearings are provided at both ends of the cast conrod which are reamed to high finish and excellent fit on wrist pin and crankpin. All parts of both engines are produced to a consistently high standard of finish and accuracy.

Having used the X Type for some considerable time since testing, we have had ample opportunity to see how the design behaves over a prolonged period under strenuous flying conditions, and while other engines tested have also subsequently given excellent service, we can in this case include in the report the fact that the new Cubs stand up exceptionally well, and start easily even when air temperature is well below freezing point.

TEST: OK Cub .049X

Plug: OK Short Reach as supplied. 1 1/2 volts to start; Fuel: O. & R. A.A.; Running Time Prior to Test: 2 1/4 hours; Bore: .420 in.; Stroke: .360 in.; Weight: ca. 1 1/2 oz. (for both types with prop supplied).

Power Prop	
6 x 5	9,000
6 x 4	10,200
6 x 3	12,800
5 1/4 x 5	11,500
5 1/4 x 4	13,000
5 1/4 x 3	15,400
Top Flite	
6 x 5	8,250
6 x 4	10,000
6 x 3	11,600
Kaysun 5 x 4 *as supplied*	14,600

A recent check on our well used Type X showed that these figures are now exceeded by some 10 per cent, and that probable flight rpm with Kaysun props is upwards of 17,500.

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America Wins Wakefield & FAI

(*Continued from page* 12)

could type with *both* fingers), were at work on the first edition of the "Cranfield Chronicle," the daily newssheet of the Championships. Shortly before dawn, SMAE Chairman A. F. Houlberg put a sleepy head round the corner and contributed a heartfelt closing message to the final page: "Too much noise—some people are still trying to get some sleep!"

The next day (Sunday, Aug. 2) was better than anyone had even dared hope for. Practically no wind, brilliant sunshine and a sky that held out the promise of thermals aplenty—much to the relief of the power fliers whose contest was scheduled first, with the Wakefield on the following day.

To insure that each team got its fair share of the weather conditions—good or bad—the three rounds of the contest were each split into four half-hour periods, during which only one member from each team was allowed to fly. Take-off points were situated on the main concrete runway, with spectators and cars kept well back behind ropes. With only time-keepers, one helper for each contestant and official photographers allowed out on the termac, the usual obstruction hazards were appreciably reduced.

When the first round was well under way, it was apparent that the thermals were there—but you had to grab plenty of height to make sure of hooking one. When all 46 contestants had flown, the score board showed that seven had chalked up maximums of five minutes each—including America's Dave Kneeland and J. Elgin, George Woodworth of Ireland, Yugoslavia's George Zignic and two Frenchmen, P. Lefort and A. Goetz. The outstanding impression of the first round was the overwhelming power superiority of the hot engines being used exclusively by the American team.

During the break for lunch before the second round, we decided to check up on *all* the powerplants being used, and the fruits of this survey are listed in the table at the end of this report. In a nutshell, we found that 35 of the 46 entrants were using Diesels, and the remainder, glow motors.

In the next round, both Kneeland and Woodworth again put up five minute flights, while several other competitors boosted their two-flight total to around the nine minute mark. In the final round, the odds seemed to favor Kneeland, since he had so far been out-climbing his nearest opponents. Several of the latter flew and glided in without scoring maximums. Then Kneeland came out for his last flight, flicked the prop, and his model went up like a V-2. A half loop wasted some of the power run, but the pull-out was clean and there was lots of space between the model and the Cranfield runway. After losing height slowly for a minute or so, there was a noticeable jolt as the model hit a riser, after which the rate of descent slowed right down and it became plain that this was going to be still another five minute flight. The model had drifted only a few hundred yards from the take-off point, so knowing that no other competitor still to fly could match Kneeland's total of three maximums (15 minutes), we hot-footed it over to the point where the model was coming in and secured what we believe is the first photo of a World Championship model about to land on its actual winning flight.

Dave Kneeland's FNAFOM Cup winner was beautifully built and one of the best looking power models in the contest, with its white fuselage and two-toned orange surfaces. Dave used a Cumulus wing and stabilizer, with a diamond fuselage of his own design. The Torpedo .15 was fitted with an 8 x 4 in. prop and slight left-thrust was used (no downthrust). For further details see the three-view based on sketches we made in Dave's bedroom that same evening.

Second place went to Great Britain's George Fuller who had turned in consistent flights of 4:26, 4:50 and 4:02. George flew a simple Elfin 1.8 original pylon, which featured a flat sectioned wing and stab, the latter tilted 1 in. Marked side and downthrust were used, a feature not unusual on

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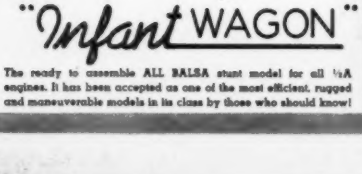
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some British and Continental models (one Dutch model had 20° downthrust). Third went to G. Vidossich of Italy, who put up two five-minute flights after a poor first round time of 2:24. He flew an attractive Super Tigre (folding prop) shoulder-wing of rather high aspect ratio. Ribs on wing (NACA 6409 section) and stab were set in "W" pattern and the model had 10° left sidethrust. In fourth place was Britain's Pete Buskell with the same ED 2.46 powered original pylon, which won him first place in F/F at this year's British Nats.

Fifth went to A. Lederer of Austria who flew the most unorthodox model in the contest. Another ED 2.46 design, this nightmarish entry took off vertically from stab and fin supports, climbed steadily to a good height, then settled into a rock-steady glide. The sheeted wing had an ultra-thin birdlike section and a large forward fin positioned at the wing center section. In sixth place was Stan Hill with his Amazon 400 (his wife's design), this being a special modified version built to take the Torpedo 15. The two other U. S. team members, Elgin and Wheeley, placed eleventh and eighteenth in the final listing.

We kept our eyes open for any outstanding new trends, but although many out-of-the-rut models were flown, there was no doubt that Carl Goldberg's pylon layout is still king when it comes to F/F. It seemed particularly appropriate that a model based on a Goldberg design should win this, the most important International F/F contest yet held. Some unorthodox models flew surprisingly well, but there were only two such outstanding designs among the top dozen places: Lederer's forward-fin job and C. Kempen's swaybacked highthrust line pylon, with dihedral stab and tip fins on both surfaces.

We noted one high aspect ratio Dutch design which featured a rubber thread turbulator mounted on ply struts 1 in. forward of the wing leading edge. One of the Austrian models had a wing so thin that it fluttered like an ornithopter at the bottom of a dive, before finally spreading itself over the runway. Worthy of mention was the widespread preference for clockwork timers, which were sometimes used to operate auto-rudders at the moment the motor was cut. Much ingenuity was shown in engine installations, cut-outs and cowling design.

At the Wakefield, although the power flying was good, the standard on Monday, Aug. 3, was outstanding. Among the contestants with previous Wakefield experience who flew at Cranfield this year were Blomgren of Sweden (last year's winner), Evans of Britain (second in '50 and designer of the '49 contest winning Jaguar), Sadorin of Italy (second in '49), John O'Donnell of Britain ('52 team member), Bob (Wakefield) Copland himself—plus America's Foster and Montplaisir, who were in the '51 and '52 teams respectively.

Flying arrangements were similar to those used in the power event; that is, three rounds, each split into four half-hour periods. Once again, weather conditions were just about perfect with stronger thermals and even less breeze than the day before. First to get away was G. Nocetti of Italy, who set the tone for the entire contest by recording a five. Almost before the applause had died away, another maximum had been scored, to be followed by yet two more. At the end of the first round, the scoreboard showed that 27 contestants (almost half of the 57 flying) had put up five-minute plus flights! Clearly this was going to be a contest worthy of celebrating the twenty-fifth anniversary of the late Lord Wakefield's donation of the trophy.

After watching most of the models take off, we gathered the following impressions of this year's crop of Wakefield designs. The longest fuselage jobs were those flown by

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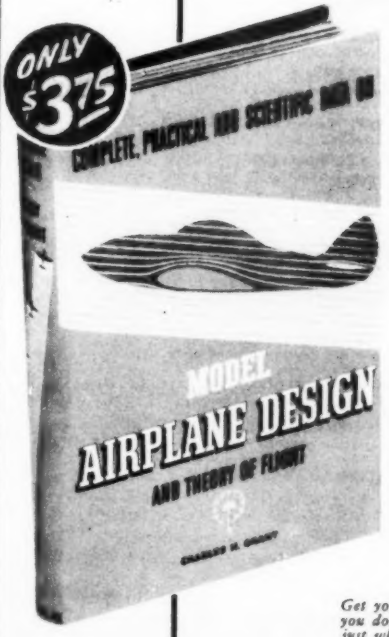

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FUNSTER: Kadling's Nats free flight. June '52.

the U.S. team, although only Montplaisir's fell into the really long Bilgri category. However, in most cases, fuselages do appear to have increased *slightly* in length, the many models now featuring similar span and over-all measurements. Geared motors were definitely in the minority in spite of the fact that the last four (and now this year's) winning designs have all employed gears.

Folding props led in popularity, with free-wheeling types running them a close second. The O'Donnell brothers and Bob Copland both used feathering props. Dihedral was mostly poly, with V next and tip last. Fins were usually central with some area underneath, although some twin fin types appeared and it was not unusual for end plates to be fitted. Geodetic surfaces were favored by about half a dozen modelers.

The second round got under way after lunch, with flying conditions little changed, although, if anything, it was hotter. Again the five minute flights started going up on the score board, until at the end of the round, 17 more maximums had been recorded. Among these were seven fliers who had already scored fives in the first round: Mrs. I. Samaan (Germany), Foster (U.S.A.), Hugh O'Donnell (Great Britain), Scotto (Argentina), A. HaKansson and C. Moberg (both of Sweden). Close behind them by only a few seconds were Madame L. Ferber (Belgium), George Reich (U.S.A.) and J. Nilborn (Sweden).

All eyes were focused on these top ten as their turns came up in the third and last round, since it seemed almost certain that one of them would pull off the contest. Soon the cry went up that Eliseo Scotto of Argentina had put up another maximum and his name went to the top of the scoreboard. The Argentine team's jubiliation was short lived, however, since 14-year-old Hugh O'Donnell—the youngest competitor and British Junior Champion—soon turned in another perfect five minute flight to draw level with Scotto.

This was something new in Wakefield history—two modelers tying for first place. But more was yet to come as Joe Foster was away on his final flight and pretty soon the board was showing his name up there at the top with Scotto and O'Donnell. George Reich (U.S.A.) was just one second behind them all with a couple of fives and a 4:59 flight. What a contest! The third round came to a close with 22 scored maximums but no one else equalled the three-flight maximums of the top men, who were by now sweating it out at the prospect of going through the whole business again in a final fly-off.

Once again the three models were weighed and then taken out to the take-off point together, since the Wakefield rules on fly-off require the competitors to take off within three minutes of each other. You could have heard a wing snap in the breathless hush when the three started winding. Scotto was first away, followed by Foster. Then, to the anguish of the British team, a strand broke in O'Donnell's motor. The precious seconds ticked away, while he hastily tied the ends together, but he just managed to get airborne in time and climbed away well. Foster got the greatest height under power, with O'Donnell next and Scotto last.

Since the fight was now between Foster and O'Donnell, and determined to be in at the end of the '53 Wakefield, we grabbed U.S. team manager Bill Fletcher, got the car started up and drove to the far side of the airfield where the two models were heading. We arrived just as Foster's job was about 50 feet above a cornfield on the other side of the hedge. It settled practically into the arms of Montplaisir—who was already there waiting for it—after a glorious flight of 7:25. By this time, O'Donnell's model was at al-

(*Continued on page* 54)

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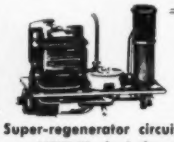

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most exactly the same spot and coming down slightly faster than Foster's. It sank gently into the cornfield after 6:20, just one minute and five seconds behind Foster's. The U.S. boys had done it again—victory was theirs in both World Championship events.

We arrived back with O'Donnell's model in time to hear the announcement that the contest jury—consisting of British, Belgian and French officials—had decided that Joe Foster should hold the Cup for the next year, although under the Wakefield rules (Section 16) the leading countries at the end of the third round (U.S.A., Great Britain and Argentina) were still the joint winners of the Wakefield contest.

Joe Foster's model was a folding-prop geared design of 47 in. span and 46 1/2 in. length. The wing was pylon mounted and the under carriage retracted. Six ounces of Dunlop rubber were used, but on the fly-off this was changed to Pirelli. Further details of this and the other two top Wakefields are included in the three-views. Mention must be made of the fine flying by the only two women contestants — Madame L. Ferber (14:55) and Mrs. I. Samaan (14:34)—who placed in fifth and eighth places.

The '53 World Championships came to a close with a banquet at which the individual and team trophies were presented to the American boys, and contest souvenirs to all the competing team members. Free flight winner Dave Kneeland came in for an additional award of a profile Jetex 50 model which looked just like—Dave Kneeland! With outstretched hands for wings, and shoes for twin-fins, this flying scale "Dave," by cartoonist Ray Malmstrom, got a big reception as it was passed along the tables.

One more international event remains for 1953: the fourth Nordic A/2 Glider World Championships at Lesce Bled in Yugoslavia. We shall be covering this meeting for MAN and we'll do our best to get three-views and plenty of data on the top models.

OFFICIAL 1953 WORLD CHAMPIONSHIPS RESULTS

POWER FREE FLIGHT

1.	Kneeland, D.	U. S. A.	15:00
2.	Fuller, G.	G. B.	13:18
3.	Vidossich, G.	Italy	12:54
4.	Buskell, P.	G. B.	12:30
5.	Lederer, A.	Austria	12:27
6.	Hill, S.	U. S. A.	12:02
7.	Tasic, T.	Yugoslavia	11:53
	Woodworth, J.	Ireland	11:53
9.	Kempen, C.	Holland	11:49
10.	Rupp, G.	Germany	11:48
11.	Elgin, J.	U. S. A.	11:45
12.	Ferber, M.	Belgium	11:42

(Remaining U. S. team member C. Wheeley placed 18th in event).

TEAM RESULTS:

1. U. S. A.: 38:47; 2. G. B.: 35:49; 3. Italy: 32:17; 4. Germany: 30:27; 5. Switzerland: 29:27; 6. Belgium: 28:43.

WAKEFIELD

1.	Foster, J.	U. S. A.	15:00
1.	O'Donnell, H.	G. B.	15:00
1.	Scotto, E.	Argentina	15:00
4.	Reich, G.	U. S. A.	14:59
5.	Ferber, Mme. L.	Belgium	14:55
6.	Nilborn, J.	Sweden	14:53
7.	Blomgren, A.	Sweden	14:40
8.	Samaan, Mrs. I.	Germany	14:34
9.	Kannenworf, L.	Italy	14:33
10.	Evans, E. W.	G. B.	14:32
11.	Fea, G.	Italy	14:28
12.	Montplaisir, C.	U. S. A.	14:02

(Remaining U. S. team member Carl Hermes placed 31st in event).

TEAM RESULTS:

1. U. S. A.: 44:01; 2. G. B.: 43:19; 3. Sweden: 43:01; 4. Italy: 41:41; 5. Belgium: 39:19; 6. Argentina: 38:49.

Man At Work

(*Continued from page* 8)

spell them to take naps, and all share in the fun. Fun? They think so, and that's what counts. New engines, new products, rumors and rumors of rumors. Tall tales—the there I was at 40,000 ft. stuff. Back home news. Franks and coke, night and day. Outside the hangar doors in the semi-darkness, friendly groups talking shop. The inevitable roar of speed engines — everybody knocks off patiently. The foreign modelers. The high interest, dash, and sportsmanship of the Mexican boys. Some of it should rub off! Walker flying Ceiling Walkers under tables at night—the kind with the gimmick for reversing flight. They'd bounce up and down under the benches. The Blue Angels formation aerobatics during the air shows on Saturday and Sunday—rained out this year on Sunday. The free flight firing line, scream of engines, and splattering crack-ups. Dozens of ships high in the sky. The concentrated action in ROW—everybody takes off in one place and you have to have eyes in the back of your head. Team racing, so quiet apparently, but so exciting if you sit down and stay a while—like the guy with the battery leads down his sleeve and the slip-on in his palm. Tourist court bull sessions with everybody falling asleep. Nationals dull—how could it be possible?

So before we get charged with an engine over-run, see you next year, and don't forget the AMA, Exchange, and our hosts, the Navy, for making it possible.

* * *

▸ From time to time have been bragging about the extraordinary effort that goes into checking facts and avoiding errors. It is a small exaggeration to say that all editors live in terror of the inadvertent slip. When one happens you get the same feeling created when your hot job hits a thermal and the dethermalizer fails to pop. For instance, Ted Martin discussed glow plugs and in his copy included a list of representative plugs. So there we were admiring a swell issue just off the press when the editorial phone jangled. Asks Charlie Brebeck, "How come, no OK plug? We manufactured over 200,000 of them last year!" You might like personally to fix that table in all of the copies of MAN bought by the faithful, but all you can say is, "Charlie, you sure should be on that list!"

* * *

▸ Do the facts that Russia possesses the atomic bomb in usable quantities, has ready the aircraft to deliver these bombs, and has exploded what is believed to have been a hydrogen bomb, disturb you? And if you knew there was a part you could play to help prevent those bombs from ever being delivered, wouldn't you want to fill that part right now? Then consider that radar cannot always detect low flying aircraft and that we modelers should make the world's best ground observers. This is a serious business which we are prompted to mention by the following item submitted to this column by Major Frank J. Parykaza (and he is a modeler), USAF, for the Office of Civil Defense:

"The Ground Observer Corps was well represented at the Nationals. A 40-ft. Air Defense Command exhibit and a 25-ft. Telephone Co. exhibit were great sources of interest. The Air Force needs your services as a member of the Ground Observer Corps. Contact your local Civil Defense Director or write to the GOC, Washington 25, D.C."

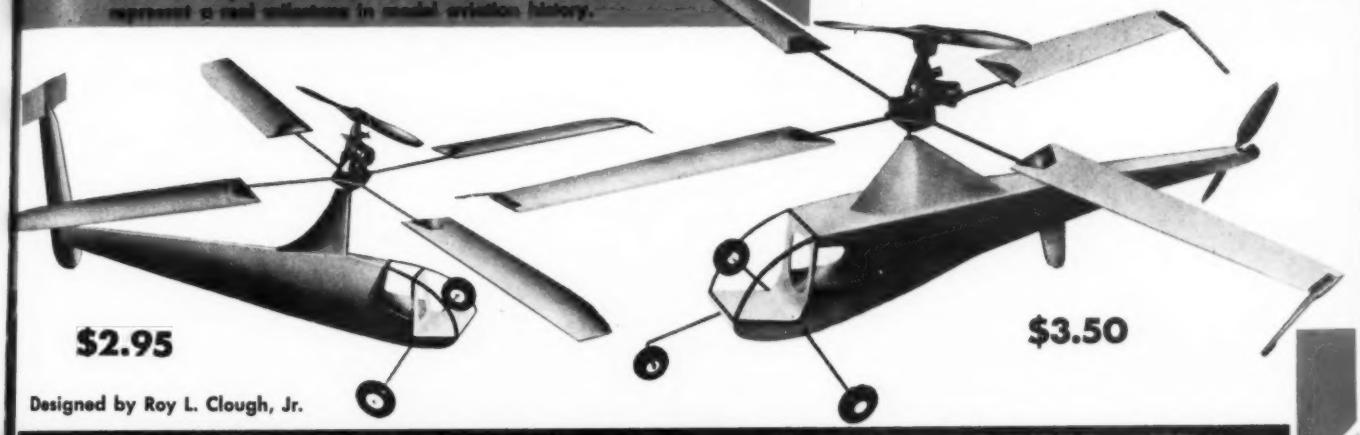
* * *

▸ And as we go to press, George Perryman, on the way home from Lesce Bled, Yugoslavia, reports that Hans Hanson, Denmark, took first in the Nordic with 15 minutes; German second with 14:45, and France third. A full report appears in the next issue. END

CLIMB VERTICALLY - HOVER - FLY FORWARD & BACKWARD -

HELICOPTERS - BY Berkeley

Berkeley has always been recognized as the pioneer in Model Airplane Development. These new models represent a real milestone in model aviation history.



$2.95

$3.50

Designed by Roy L. Clough, Jr.

CLOUD-COPTER "D"
with Fixed Drogue Tail

For .045 to .074 Engines — 26" Rotor Span

CLOUD-COPTER "TR"
with Adjustable Pitch Tail Rotor

For .045 to .074 Engines — 25" Rotor Span

Here is a real advance in model flying. So new and different that the performance is almost unbelievable. You can actually adjust a "CLOUD-COPTER" to hover, fly forward or backward and even spiral climb like a conventional gas model. Fully automatic Cyclic and Collective Pitch Vanes, as on full-scale helicopters, permit the rotor to continue in the same direction after the engine stops. "CLOUD-COPTERS" are quickly built from our highly prefabricated kits.

EACH "CLOUD-COPTER" KIT CONTAINS:

Complete Metal Rotor Mast Assembly; Metal Blade Holders designed for quick replacement of blades; Metal Blade Balance; Engine Shock Mount; Shaped Rotor Blades; Die-Cut Sheet Balsa fuselage; Wheels; Die-cut Celluloid Windshield.

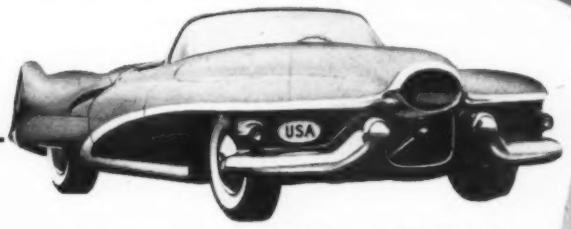
SPORT CARS - by Berkeley

- JEWELRY CAST METAL BUMPERS, GRILL, LIGHTS, STEERING WHEELS!
- STAMPED METAL HUB CAPS!
- FULLY CARVED AND HOLLOWED BALSA BODIES!
- PLASTIC UPHOLSTERY!
- AUTHENTIC DECALS!
- FULL WIDTH METAL AXLES!
- RUBBER WHEELS!
- DETAILED FULL SIZE PLANS!

British **"JAGUAR"**

123.6 mph English Sport Car.

$1.50



General Motors **"LE-SABRE"**

330 Horsepower experimental car.

$1.50

Nash **"HEALEY"**

English Body, Nash Engine. 106 mph

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We have spent over a year perfecting special casting processes and gathering data on these sport cars. They are the ultimate in pre-fabrication yet competitively priced. Take a look and be convinced.

Note: The Jewelry Casting process enables us to give you superbly detailed clean castings.

Bodies fully carved ready for trimming and sanding.

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If no local dealer is convenient, mail orders will be filled by Berkeley Model Supplies, Dept. MA., West Hempstead, N.Y. Please include 25¢ packing & postage.

Berkeley's 20TH ANNIVERSARY SPECIAL DESIGN..

$4.95

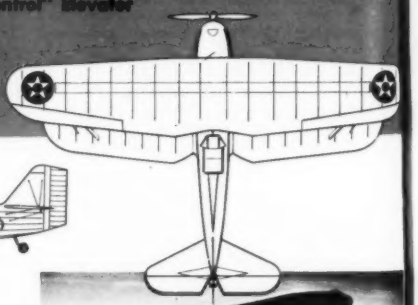
- Deep Drawn Metal Cowl!
- Stamped Metal Wing Struts!
- Formed Metal Wheel Pants!
- Metal Rudder, Elevator Hinges!
- Formed Wire Landing Gear!
- Jim Walker "U-Control" System!
- "Autotrol" Rudder System!
- Rubber Wheels, Hardware!
- Authentic Decals in 4 colors!
- Full Size Detailed Plans!
- Shaped Fuselage Sections!
- Side Profile Assembly Keel!
- Shaped and Notched Wing Edges!
- Die-Cut Balsa and Plywood!
- Celluloid, Covering Tissue!

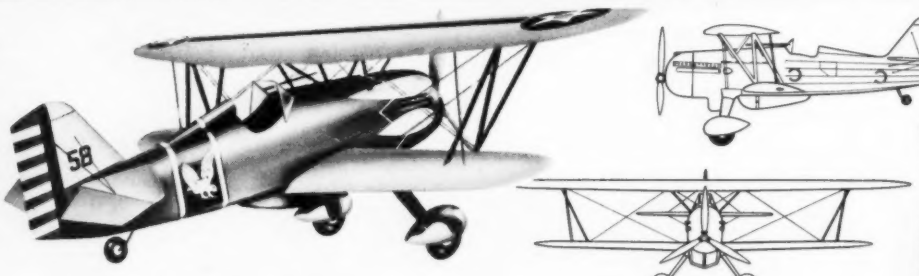
CURTISS HAWK "P-6E"

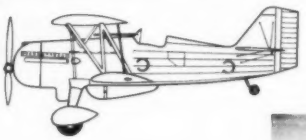
For .09 to .15 Engines — ¾" Scale — 23¾" Wingspan

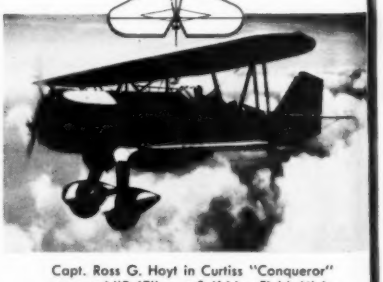
"Autotrol" Automatic Rudder — Genuine Jim Walker "U-Control" Elevator

Designed by Don McGovern and Bill Effinger
with the cooperation of the Air Force Technical Museum





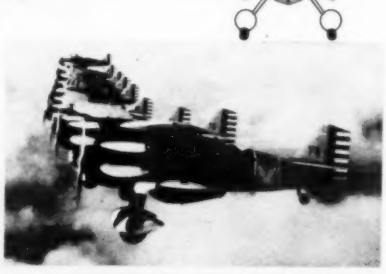




...is authentically detailed Curtiss Hawk "P-6E" has been designed for ease of construction. The wings are of sparless construction, with shaped and notched leading and trailing edges. Die-cut ribs slip right into place.

A die-cut side profile insures rapid and accurate former assembly. Shaped blocks are included for curved forward portions. Formed metal cowl and wheel pants simplify construction. Sheet stab and rudder with concealed hinges.

Lower wing is aligned by fuselage side profile. After covering both wings, the stamped metal struts are installed and upper wing is dropped into position, aligned.



Formation of "P-6E's" from Selfridge Field, Mich.

Capt. Ross G. Hoyt in Curtiss "Conqueror" powered "P-6E" over Selfridge Field, Mich.

The Curtiss Hawk "P-6E" is one of the great historical models of the Air Force. It was our best pursuit ship of the early 1930's. Berkeley's model is authentic, scaled without deviation from rare service manuals supplied to us by the Air Force Technical Museum. The complete decals for the famous "17th Pursuit Squadron" from Selfridge Field, Mich. make it a really beautiful model to own and fly.

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USA WINS

WORLD POWER CHAMPIONSHIPS WON BY AMERICAN TEAM

Left to right: Stan Hill, Carl Wheeley, Dave Kneeland and Joe Elgin as they arrived at Cranfield, England. The Franjo Kluz team power trophy was won with a total time of 38 minutes, 47 seconds. *(Aeromodeller photo)*

From THE CRANFIELD CHRONICLE, August 2, 1953
Daily News of the World Model Flying Championship

AMERICAN "TORPEDO" SINKS ALL OPPOSITION!

USA WINS BOTH POWER TROPHIES!!

"Heartiest congratulations from competing teams, officials and visitors alike were extended to Dave Kneeland of Hickman Mills, Missouri, USA, on his clear cut victory over competitors of 14 nations at Cranfield this afternoon."

WORLD'S CHAMPION ENGINE

Yes, the new K & B Torpedo 15 is truly the world's champion engine. The first twelve production engines were given to the American team, just a few days prior to their departure for England. Several of the team members stated that it was due to the tremendous power of the new 15 that helped them win. All USA team members were flying the Torpedo 15 in their original or modified designs. First place winner Dave Kneeland used an original fuselage which mounted a "Cumulus" wing and tail. His ship was called "Vapor Trails." Dave used K & B Supersonic 1000 fuel to insure peak performance. Take a tip from the boys who went to England to meet the top fliers from all over the world.

DAVE KNEELAND TAKES FIRST PLACE HONORS

Kneeland is carried on the shoulders of his teammates after his victory. Fellow on right is Joe Foster who won first place in the Wakefield event. Dave is 29 years old and lives near Kansas City, Mo., where he works for Midwest Research Institute. *(Aeromodeller photo)*

Below he is pictured with A. F. Houlberg, S.M.A.E. chairman. Houlberg congratulates Dave as the 1953 Free Flight world champion. *(Model Airplane News photo)*

THEY NEEDED THE BEST — THEY FLEW THE BEST

McCOY ENGINES SET NEW RECORDS AT NATIONALS!

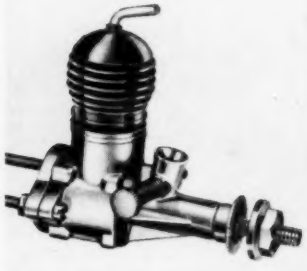
Diesel Proves Meet Sensation; "Red Heads" Flash New Speed Marks

NAVAL AIR STATION, Willow Grove, Pa.—Sensational victories were scored here by McCoy powered planes as five first places were recorded and three new records established in the 22nd annual National Model Airplane Championships. Some 1,200 modelers from throughout the nation competed.

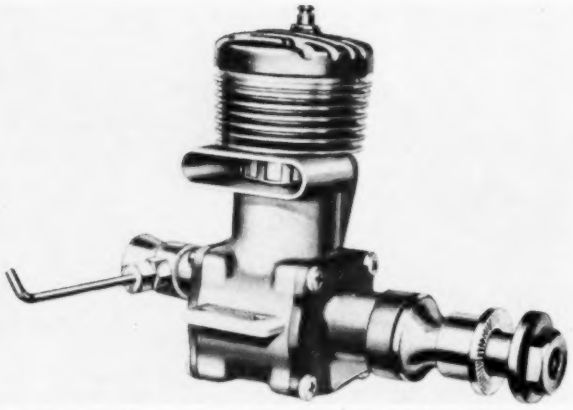
Notable in the country's top meet was the sparkling performance of Diesel powered craft. This marked the first year of competition for this new McCoy engine, introduced only a few months ago to modelers.

Record Lift

A record lift was recorded by Hal Roth of Richmond, Calif., with a 23¾ ounce load in his Diesel powered Clipper Cargo flying the Free Flight ½ A PAA event.



McCOY DIESEL *carried the load*



McCOY RED HEAD "60" – *this is the engine that showed the speed*

First place with another Diesel in the senior ½ A PAA Load was James W. Bowers, Cleveland, O., with a performance at 8.16.2.

Diesels, McCoy 19's and McCoy 49's showed up in classy fashion in numerous other free flight events garnering trophies for several entrants.

Red® Heads Hot

Smashing triumphs were recorded in speed events by competitors who consistently chose McCoy's famous Red Head "60" to power their craft. Two record breaking performances were recorded in the C-D Open and the Senior Division.

The McCoy "60" virtually dominated these two divisions, taking first and second places in both as well as two additional places in each event.

Guy Rogers, Corpus Christi, with 151 MPH smashed the open speed record with his McCoy powered plane, while Sam Dehelean's sensational 153 MPH established a new top speed in the Seniors.

In the Junior Class C-D, every one of five winners powered his ship with the McCoy "60." Top performance in this event was displayed by Alfred Davis' McCoy powered plane.

At press time, results of numerous

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